

# POPULAR SCIENCE

FEBRUARY • 35c Monthly

U. S. Army Builds

## City Under Ice

PAGE 86

Driving Test —  
10,000 Miles in  
a Ford Falcon

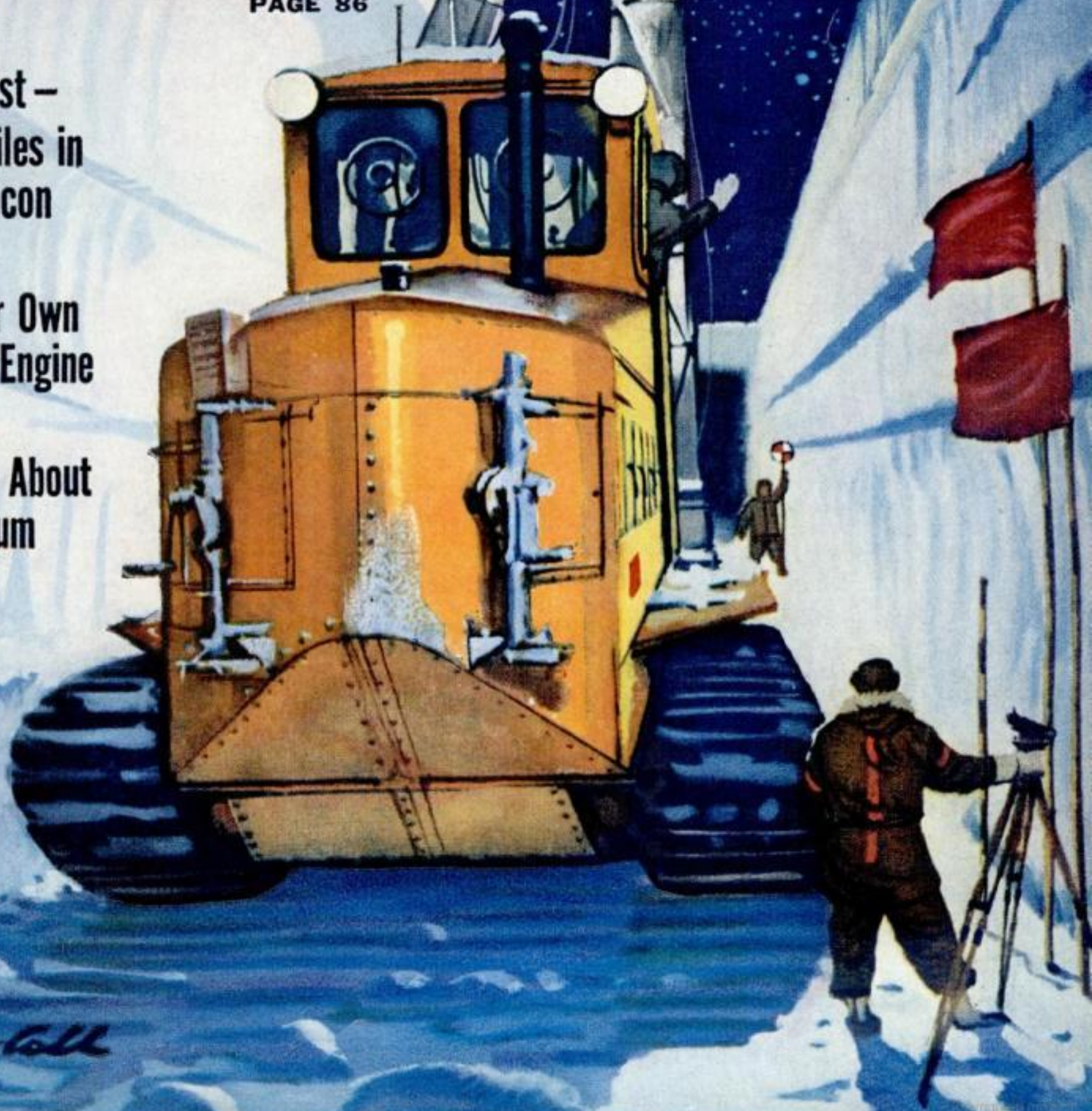
PAGE 74

Build Your Own  
Magnetic Engine

PAGE 147

The Truth About  
Truth Serum

PAGE 106





# NEW, Direct-At-Cost

## GUARANTEED CONTINUABLE PROTECTION



- Provides EXTRA income while you are accidentally disabled!
- Helps pay those higher-than-ever doctor and hospital bills!
- Helps replace savings or possible loss of income!
- Pays your family as much as \$15,000 if you lose your life, sight or limbs by accident!

Perhaps you believe the hospital care protection you now own is enough to safeguard your family should an accident put you, the family breadwinner, on the shelf.

### If so, just consider this:

- Hospital costs have actually doubled within the past ten years alone . . . Has your present coverage kept pace?
- Doctor and surgical costs have also gone up . . . Is your present coverage able to meet today's *increased* cost of medical care?
- And what about income protection? . . . Does your present coverage, if any, take care of what is often the biggest single item of expense in an accident — *income lost because you're no longer on the job?* (The Commercial Travelers loss-of-time benefits are paid direct to you whether your income is affected or not, and regardless of extra expenses caused by an accident.)

### MORE PROTECTION Per Dollar

Serving business, professional and technical men, students and all other preferred male risks *direct* and solely for their mutual benefit, this strong old non-profit association literally gives you *protection at cost*. Members' charges are based solely on the full cost of insurance protection, necessary reserves and operating expenses. Pioneer in personal protection since 1883, the Association has paid more than \$125 million benefits to its members and now has resources of more than \$12 million for their future protection. This is world-wide coverage. We are licensed both in New York and Canada.

### POLICIES NOW GUARANTEED CONTINUABLE!

Besides being exceptionally economical, broad-coverage accident insurance policies now being written by The Commercial Travelers of Utica offer you the vital *extra* protection of being *guaranteed continuable for life*. This means that now only *you*, the policyholder, can terminate this coverage. And the favorable low rates now prevailing can be changed *only* if there is a general rate adjustment, up or down.

All Kinds of Accidents are Covered except suicide and losses caused by war or while engaged in military service in time of war, insurrection or riot, or as a passenger in a military aircraft or a pilot or paid crew member of any aircraft. *No other accident exclusions!* All kinds of civilian passenger air travel covered, as are hobbies, recreational hazards and other avocational risks!

### 3 PLANS AVAILABLE

Benefits are paid from first day for each accident for as many as 104 weeks of total, or total and partial disability combined, as shown below, whether your income is interrupted or not. *Coverage is continuable for life.*

#### Choice of Amounts

Total disability, weekly, up to 104 weeks . . .

\$ 75.00	\$ 50.00	\$ 25.00
----------	----------	----------

Partial disability, weekly, up to 26 weeks . . .

\$ 37.50	\$ 25.00	\$ 12.50
----------	----------	----------

Loss of life, to age 70 . . .

\$ 15,000	\$ 10,000	\$ 5,000
-----------	-----------	----------

Loss of life, after age 70 . . .

\$ 3,000	\$ 2,000	\$ 1,000
----------	----------	----------

Loss of both hands or feet, or one hand and one foot, or sight of both eyes, *payable in addition to weekly indemnity* . . .

\$ 15,000	\$ 10,000	\$ 5,000
-----------	-----------	----------

#### Current Quarterly Cost

\$ 10.50	\$ 7.00	\$ 3.50
----------	---------	---------

No Age Limit for Continuing Accident Coverage, but you must be at least 18 and under age 55 to join.

### OTHER LOW-COST BENEFITS GUARANTEED CONTINUABLE

Broad Sickness Insurance *guaranteed continuable* without modification of benefits to age 65, and Surgical and optional Hospital Room benefits *guaranteed continuable for life* are also available to preferred-risk men at modest added cost.

For Employed WOMEN, there's Accident, Sickness and Hospital & Surgical Insurance, and for HOUSEWIVES and other preferred-risk women not necessarily employed there is an excellent Accident Expense policy that is *guaranteed continuable for life*.

### SEND CARD, BUT NO MONEY!

Whether you now have partial protection, or none at all, it will pay you to get complete information now on these desirable, low-cost Commercial Travelers guaranteed continuable coverages. So fill out the card right now, while the matter is uppermost in your mind. It may well be the most significant card you ever mailed.

 **FILL OUT AND MAIL YOUR CARD TODAY!**





THESE ARE SOME OF THE NUTS AND BOLTS AND SCREWS THAT WERE NOT PUT INTO THE BODY AND FRAME OF THE 1960 PLYMOUTH.

*They just can't loosen and rattle because they're not there. The Solid 1960 Plymouth's new Dura-Quiet Unibody is welded around 5400 times.*

Ordinary unit body construction isn't particularly new. But *this* kind is!

Chrysler Corporation pioneered unit building in 1934 and turned out the first welded-unit American passenger cars. Later, the method was adapted by other manufacturers. But there were problems, in the way of noise and vibration, and chance of rust and corrosion.

Chrysler engineers kept the idea under study. To it, they applied the biggest digital electronic computer program in the auto business. They used methods developed in the building of space missiles. They built an "electronic highway" to simulate all kinds of road conditions.

The outcome is a new kind of car body—quieter, tighter, more solid than any you have known. With more room inside. Doors and windows that fit tightly. And a noticeably steadier ride, combined with easier, brisker handling.

Unibody Plymouth is made to *stay* quiet and solid for an unusually long time. Corrosion is licked for years to come by the greatest protective treatment ever given an American car. This Plymouth is, we believe, the best-built, best-performing car in the low-price class. Try it!



Body and frame are welded as one unit with Dura-Quiet Unibody construction.

## SOLID PLYMOUTH 1960

A Chrysler-engineered product, built a new solid way to give you solid satisfaction.





**Fuel Cell:** Will this device run your electric car? P. 69



**Sleepyhead:** Can't even wake him for Groundhog Day. P. 82



**PS Report:** Economy is this car's middle name. P. 74

Founded in 1872 Vol. 176 No. 2

Mechanics and Handicraft REG. U. S. PAT. OFF.

# Popular Science

**February, 1960**

Cover painting by Bob McCall

## CARS AND DRIVING

- [10,000 Miles in a Falcon..... 74](#)
- [Compacts Bring Out More Models 80](#)
- [U.S. Front-Drive Cars Coming?.... 96](#)
- [Poles Build Cars from Junk.....128](#)

## SCIENCE AND INDUSTRY

- [Camera Catches Laws of Nature.... 92](#)
- [TV Goes to Tape.....101](#)
- [The Truth About Truth Serum....106](#)
- [Pluto . . . Deadlier Than ICBM?..122](#)

## CONSUMER NEWS

- [What's New .....116](#)
- [New in Boating.....120](#)
- [Camera Stores Own Filters.....159](#)

## SPECIAL FEATURES

- [Nature's Big Sleep..... 82](#)
- [City Under Ice..... 86](#)
- [How Fire Sprinklers Work.....114](#)
- [Village Smithy Makes House Calls..126](#)
- [Backstage at Winter Olympics.....136](#)
- [Camera in a Cigarette Pack.....157](#)

## DISCOVERIES AND INVENTIONS

- [Electric Tractor Makes Its Juice.... 69](#)
- [GOER Truck Goes Anywhere.....110](#)
- [Fold-Up Scooter Weighs 51 Lb....134](#)

## PICTURE NEWS

- [Catching Fish with Air Bubbles....104](#)
- [Space-Saving Spare Tire.....109](#)
- [Air-Sea Rescue at High Speed.....113](#)
- [Future Tankmen May Ride on Air..124](#)
- [Shelter Keeps Out Fallout.....133](#)

**Editor** HOWARD ALLAWAY

**Managing Editor** FRANK ROWSOME JR.

**Art Director** HOWARD C. JENSEN

### Assistant Managing Editors

Kendall W. Goodwyn  
Robert P. Stevenson

### Senior Editors

Devon Francis, Martin Mann  
Everett H. Ortner

### Technical Editor

Hubert Luckett

### Detroit Editor

Ken Fermoye

### West Coast Editor

Wesley S. Griswold

### Associate Editors

Erik H. Arctander, Alden P. Armagnac  
Frank Dorr, Sheldon M. Gallager  
Ernest E. Hickman, James T. Howard  
Herbert O. Johansen, Herbert R. Pfister  
Joan Steen, Ruth Westphal

### Editorial Assistants

Rosa Lee Beeland (Chief)  
Anna Dallas, Bebe Lipson  
Roberta Marks  
Georgette Sparks

EDITORIAL OFFICES: 355 Lexington Ave., New York 17, N. Y.

### Art Editors

Herbert Anthony, Reginald A. Hawley  
Harry Samuels

### Art Associates

Bertrum Green, Eric A. Karminski Jr.  
Henry W. Kazmirowski, Richard J. Meyer  
Dana B. Rasmussen, Donald R. Smith

### Photography

W. W. Morris (Chief)  
Robert D. Borst, Eugene Colangelo





**Money maker:** This machine must crank it out. P. 162



**Serum:** Can it force you to tell the truth? P. 106



**Motor:** Steam engine? No. But mighty cute. P. 147

# Monthly

*America's Leading New-Idea Magazine for 88 Years*

## HOME AND SHOP

<u>Knee-Spring Struts for Planes.....</u>	<u>139</u>
<u>Install a Stairwell Closet.....</u>	<u>143</u>
<u>Tips for a Better Solder Job.....</u>	<u>144</u>
<u>Building a Magnetic Engine.....</u>	<u>147</u>
<u>PS Cut-Out Kite.....</u>	<u>153</u>
<u>A Wagon-Wheel TV Turntable.....</u>	<u>161</u>
<u>Home Magic: Making Money.....</u>	<u>162</u>
<u>A Dinghy with Radio-Control?.....</u>	<u>166</u>
<u>One Machinist Tells Another.....</u>	<u>170</u>
<u>I Cut Metal with My Bandsaw.....</u>	<u>174</u>
<u>Drill-Press Jig-of-All Jobs.....</u>	<u>176</u>
<u>Periscope Magnifies the Scene.....</u>	<u>194</u>
<u>Marking Metal for Layouts.....</u>	<u>196</u>
<u>Materials File: Cut Nails.....</u>	<u>199</u>
<u>Fix-It File: Resilient Tile.....</u>	<u>201</u>
<u>My Prize Projects.....</u>	<u>202</u>
<u>Case of the Yellow TV Coil.....</u>	<u>204</u>
<u>For the Man Who Can Weld.....</u>	<u>207</u>

Classified Advertising Section Begins on Page 260

## AUTO UPKEEP

<u>How Motorists Boost Batteries.....</u>	<u>210</u>
<u>Hints from the Model Garage.....</u>	<u>211</u>
<u>Gus Takes a Long Chance.....</u>	<u>214</u>

## SHORT CUTS AND TIPS

<u>Rubber Horseshoes Support Hose..</u>	<u>156</u>
<u>Book Ends from License Plates....</u>	<u>160</u>
<u>Plywood Zebra Is Clothes Rack....</u>	<u>169</u>
<u>Breadboard from Flooring.....</u>	<u>193</u>
<u>Make a Sandpaper-Cutting Jig.....</u>	<u>224</u>

## EVERY MONTH

<u>PS Readers Talk Back.....</u>	<u>6</u>
<u>Have You Heard?.....</u>	<u>18</u>
<u>The Month in Science.....</u>	<u>25</u>
<u>Detroit Report .....</u>	<u>62</u>
<u>I'd Like to See Them Make.....</u>	<u>100</u>
<u>New Ideas from the Inventors.....</u>	<u>130</u>
<u>Wordless Workshop .....</u>	<u>154</u>

Publisher EUGENE S. DUFFIELD

Advertising Manager LEE P. ADAMS

Circulation Director EUGENE WATSON

### ADVERTISING OFFICES:

NEW YORK—355 Lexington Ave.  
CHICAGO—360 North Michigan Ave.  
DETROIT—2810 Book Bldg.  
SAN FRANCISCO—114 Sansome St.  
CLEVELAND—636 B. F. Keith Bldg.  
LOS ANGELES—711 South Vermont  
PORTLAND, ORE.—520 S.W. Sixth Ave.

### SUBSCRIPTION SERVICE:

Address all subscriptions and correspondence concerning them to: Popular Science Subscription Department, 355 Lexington Ave., New York 17, N. Y. Allow four

week's notice for change of address. Please give both old and new addresses, including zone numbers. Published monthly at 355 Lexington Ave., New York 17, N. Y., by Popular Science Publishing Co., Inc., Godfrey Hammond, Chairman of the Board; Eugene S. Duffield, President; Franklin E. Parker Jr., Secretary; Eugene Watson, Vice-President; Robert D. Beals, Treasurer and Business Manager. Second-class postage paid at New York, N. Y., and at additional mailing offices. Entered as second class matter at the Post Office Department, Canada. Printed in U.S.A.

Copyright, 1960, by Popular Science Publishing Co., Inc. All rights reserved in the United States, Great Britain, and in all the countries participating in the International Copyright Convention and Pan-American Copyright Convention. Single copy 35¢. Subscriptions to United States, its possessions, and Canada, 1 year \$3.40 (2 years \$6.00, 3 years \$8.00). Elsewhere, 1 year \$6.00 (2 years \$11.00, 3 years \$16.00). Send notice of undelivered copies on Form 3579 to Popular Science Monthly, 355 Lexington Avenue, New York 17, N. Y.



# HE JUST DOESN'T HAVE IT..!



I OVERHEARD THE BOSS TALKING ABOUT ME—FRANK SMITH! THE WORDS HURT. BUT DEEP DOWN I KNEW THEY WERE TRUE.

I'D WATCHED OTHER YOUNGER MEN MOVING AHEAD, GETTING RAISES...THE GOOD JOBS. WHY WAS I BEING LEFT BEHIND?

GEE—ANOTHER PROMOTION, JIM? CONGRATULATIONS!

THANKS, FRANK. SORRY YOU'RE NOT COMING ALONG, TOO.

I CAN'T UNDERSTAND IT. I WORK AS HARD AS EVERYBODY ELSE.

YOU NEED SPECIAL TRAINING, FRANK. THESE DAYS, EXPERIENCE ISN'T ENOUGH.

THAT NIGHT I FELT DESPERATE. THEN MY WIFE SAID SOMETHING THAT CHANGED MY WHOLE LIFE!

REMEMBER THAT INTERNATIONAL CORRESPONDENCE SCHOOLS' ADVERTISEMENT YOU SAW THE OTHER DAY? I SAVED IT FOR YOU.

SAY! THAT'S AN IDEA—MAYBE I.C.S. CAN GIVE ME THE JOB TRAINING I NEED TO GET AHEAD!



I MAILED THE I.C.S. COUPON. THE FREE CAREER KIT I.C.S. SENT ME BY RETURN MAIL PROVED TO ME WHAT I.C.S. COULD DO.

THE I.C.S. COURSES SURE ARE PRACTICAL. I'M ALREADY USING ON THE JOB ALL THAT I'M LEARNING!

THE BOSS HEARD ABOUT MY I.C.S. COURSE. AFTER THREE MONTHS I GOT A GOOD RAISE—AND A LITTLE LATER...

I GUESS I WAS WRONG, FRANK. YOU'VE GOT WHAT IT TAKES. WE'RE GIVING YOU A PROMOTION. YOU EARNED IT, AND THE WAY YOU'RE GOING THERE'LL BE ANOTHER RAISE SOON!

I COULDN'T WAIT TO TELL THE FAMILY THE GOOD NEWS.

I GOT THE PROMOTION! AND ALL BECAUSE YOU SAVED THAT I.C.S. ADVERTISEMENT! MAILING THE COUPON WAS THE BEST MOVE I EVER MADE!

# FREE!

## I.C.S. CAREER KIT

SEND COUPON NOW...  
GET ALL  
THREE BOOKLETS

1  
2  
3

"HOW TO SUCCEED"  
32-PAGE CAREER BOOKLET  
CAREER CATALOG...  
OPPORTUNITIES IN YOUR  
FIELD.  
SAMPLE LESSON (MATH)  
SHOWS I. C. S. METHOD.



For Real Job Security—Get an I. C. S. Diploma! I. C. S., Scranton 15, Penna.

Accredited Member,  
National Home Study Council

## INTERNATIONAL CORRESPONDENCE SCHOOLS



BOX 71659B, SCRANTON 15, PENNA.

Without cost or obligation, send me "HOW TO SUCCEED" and the opportunity booklet about the field BEFORE which I have marked X (plus sample lesson):

### ARCHITECTURE and BUILDING CONSTRUCTION

- ☐ Air Conditioning
- ☐ Architecture
- ☐ Arch. Drawing and Designing
- ☐ Building Contractor
- ☐ Building Estimator
- ☐ Carpenter Builder
- ☐ Carpentry and Millwork
- ☐ Carpenter Foreman
- ☐ Heating
- ☐ Painting Contractor
- ☐ Plumbing
- ☐ Reading Arch. Blueprints

### ART

- ☐ Commercial Art
- ☐ Magazine Illus.
- ☐ Show Card and Sign Lettering
- ☐ Sketching and Painting

### AUTOMOTIVE

- ☐ Automobile
- ☐ Auto Body Rebuilding and Refinishing
- ☐ Auto Engine Tuneup
- ☐ Auto Technician

### AVIATION

- ☐ Aero-Engineering Technology
- ☐ Aircraft & Engine Mechanic

### BUSINESS

- ☐ Accounting
- ☐ Advertising
- ☐ Business Administration
- ☐ Business Management
- ☐ Cost Accounting
- ☐ Creative Salesmanship
- ☐ Managing a Small Business
- ☐ Professional Secretary
- ☐ Public Accounting
- ☐ Purchasing Agent
- ☐ Salesmanship
- ☐ Salesmanship and Management
- ☐ Traffic Management

### CHEMICAL

- ☐ Analytical Chemistry
- ☐ Chemical Engineering
- ☐ Chem. Lab. Technician
- ☐ Elements of Nuclear Energy
- ☐ General Chemistry
- ☐ Natural Gas Prod. and Trans.
- ☐ Petroleum Prod. and Engr.
- ☐ Professional Engineer (Chem)
- ☐ Pulp and Paper Making

### CIVIL ENGINEERING

- ☐ Civil Engineering
- ☐ Construction Engineering
- ☐ Highway Engineering
- ☐ Professional Engineer (Civil)
- ☐ Reading Struc. Blueprints
- ☐ Sanitary Engineer
- ☐ Structural Engineering
- ☐ Surveying and Mapping

### DRAFTING

- ☐ Aircraft Drafting
- ☐ Architectural Drafting
- ☐ Drafting & Machine Design
- ☐ Electrical Drafting
- ☐ Mechanical Drafting
- ☐ Sheet Metal Drafting
- ☐ Structural Drafting

### ELECTRICAL

- ☐ Electrical Engineering
- ☐ Elec. Engr. Technician
- ☐ Elec. Light and Power
- ☐ Practical Electrician
- ☐ Practical Lineman
- ☐ Professional Engineer (Elec)

### HIGH SCHOOL

- ☐ High School Diploma

- ☐ Good English
- ☐ High School Mathematics
- ☐ High School Science
- ☐ Short Story Writing

### LEADERSHIP

- ☐ Industrial Foremanship
- ☐ Industrial Supervision
- ☐ Personnel-Labor Relations
- ☐ Supervision

### MECHANICAL and SHOP

- ☐ Diesel Engines
- ☐ Gas-Elec. Welding
- ☐ Industrial Engineering
- ☐ Industrial Instrumentation
- ☐ Industrial Metallurgy
- ☐ Industrial Safety
- ☐ Machine Shop Practice
- ☐ Mechanical Engineering
- ☐ Professional Engineer (Mech)
- ☐ Quality Control
- ☐ Reading Shop Blueprints
- ☐ Refrigeration and Air Conditioning
- ☐ Tool Design
- ☐ Tool Making

### RADIO, TELEVISION

- ☐ General Electronics Tech.

- ☐ Industrial Electronics
- ☐ Practical Radio-TV Eng'r's
- ☐ Practical Telephony
- ☐ Radio-TV Servicing

### RAILROAD

- ☐ Car Inspector and Air Brake
- ☐ Diesel Electrician
- ☐ Diesel Engr. and Fireman
- ☐ Diesel Locomotive

### STEAM and DIESEL POWER

- ☐ Combustion Engineering
- ☐ Power Plant Engineer
- ☐ Stationary Diesel Engr.
- ☐ Stationary Fireman

### TEXTILE

- ☐ Carding and Spinning
- ☐ Cotton Manufacture
- ☐ Cotton Warping and Weaving
- ☐ Loom Fixing Technician
- ☐ Textile Designing
- ☐ Textile Finishing & Dyeing
- ☐ Throwing
- ☐ Warping and Weaving
- ☐ Worsted Manufacturing

Name \_\_\_\_\_ Age \_\_\_\_\_ Home Address \_\_\_\_\_  
City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_ Working Hours \_\_\_\_\_ A.M. to P.M. \_\_\_\_\_  
Occupation \_\_\_\_\_

Canadian residents send coupon to International Correspondence Schools, Canadian, Ltd., Montreal, Canada. . . . Special low monthly tuition rates to members of the U. S. Armed Forces.



# PS Readers

## TALK BACK



### Gus Beats a Dealer

THAT worn cam that didn't operate the fuel pump in the Model Garage story [Nov.] brought back memories. I had similar trouble some years ago. On my first two trips to the garage (owned by the dealer for the car, at that) the mechanic insisted that it was ignition trouble that made me stall right on the main drag in the rush hour, or in my driveway.

The third time, he decided it was the fuel pump, pulled it, and found that the cam had worn a deep, rounded, overgrown notch in the pump-operating lever, so it wasn't lifted far enough. A welder was used to fill the low spot but the pump still didn't work dependably, so on the fourth trip a new pump was installed. No more trouble. I kinda wonder just what kind of metal was in that cam Gus discovered. Why did it wear down so much, rather than the lever, as in my car?

Still, soft cam or hard, Gus caught it on the first try.

W. E. DOUGHERTY, Lansing, Mich.

### That Elusive Pearlash

THE "Old-Timer's Formula for Fine Wood Finishing" [Nov.] fascinated me. I had hoped to try it, but have not been able to buy the "pearlash" specified. I tried several drug stores, paint dealers, and even a couple of wholesale chemical houses, without success.

H. W. PENER, Vineland, N. J.

... FROM my drug store I got a bottle of small pellets labeled calcium hydroxide and caustic potash, and a warning that it's very caustic to the skin.

ERIK MILLER, Burbank, Cal.

*Apparently old-timer Stanley's drug store is an old-timer, too; pearlash is the*

old-fashioned name for potassium carbonate (calcium hydroxide and caustic potash are not the right stuff). If your modern drug or photo-chemical store doesn't stock potassium carbonate, the Willoughby Co., 110 W. 32nd St., NYC sells it.

Mr. Stanley now emphasizes that the chemical won't produce results equal to "crude potash" obtained by leaching wood ashes. Your best bet is to make your own. Wet down wood ashes in a hopper, pass the drippings through the ashes several times to get the right concentration. A bushel of ashes will yield up to a gallon of lye. Caution: It's caustic.

### He's for Pie-Pan Tail Lights

WHAT gives with that guy who hates to follow Ford tail lights ["PS Readers Talk Back," Oct.]? I suggest that he was blinded because he was guilty of one of the major causes of accidents: following too close. I've never been a Ford owner and probably never will be, but I do like their rear lighting. There is no doubt in a person's mind when the car ahead is stopping if it is a Ford.

M. REILLY, Kirkland, Wash.

### Celluloid Aroma

A WORD on Smell-O-Vision films ["Have You Heard?" Nov.]: It's obvious



that you haven't been to the movies lately—most of them smell now.

JEFFREY FEINMAN, Brooklyn.

### In the Bag

THAT man who cleans paint brushes in a plastic bag ["Short Cuts and Tips," Oct.] must have X-ray eyes. How else could he see the brush through dirty



# Are You "STANDING STILL" on your job?

You can justify a real pay raise and a better position—by making one simple move—the move that opens the way to more earnings and promotions—*practical training*.

If YOU are "standing still" on your job—no promotions—only token increases in pay—then you had better do something about it. You know that if you are untrained, your chances of getting ahead are slim. **NOW IS THE TIME TO PREPARE.**

## WILL RECOGNITION COME?

The only answer, as you know, is that success *does* come to the man or woman who is really *trained*. LaSalle has provided the "key to success" for many thousands of ambitious people who have sought our training for more than fifty years.

Get all the facts. Investigate the opportunities in your chosen field. It costs you nothing to learn about LaSalle's proven and tested accredited correspondence courses in the major fields of business. You can train right in the privacy of your own home, progressing at your own rate.

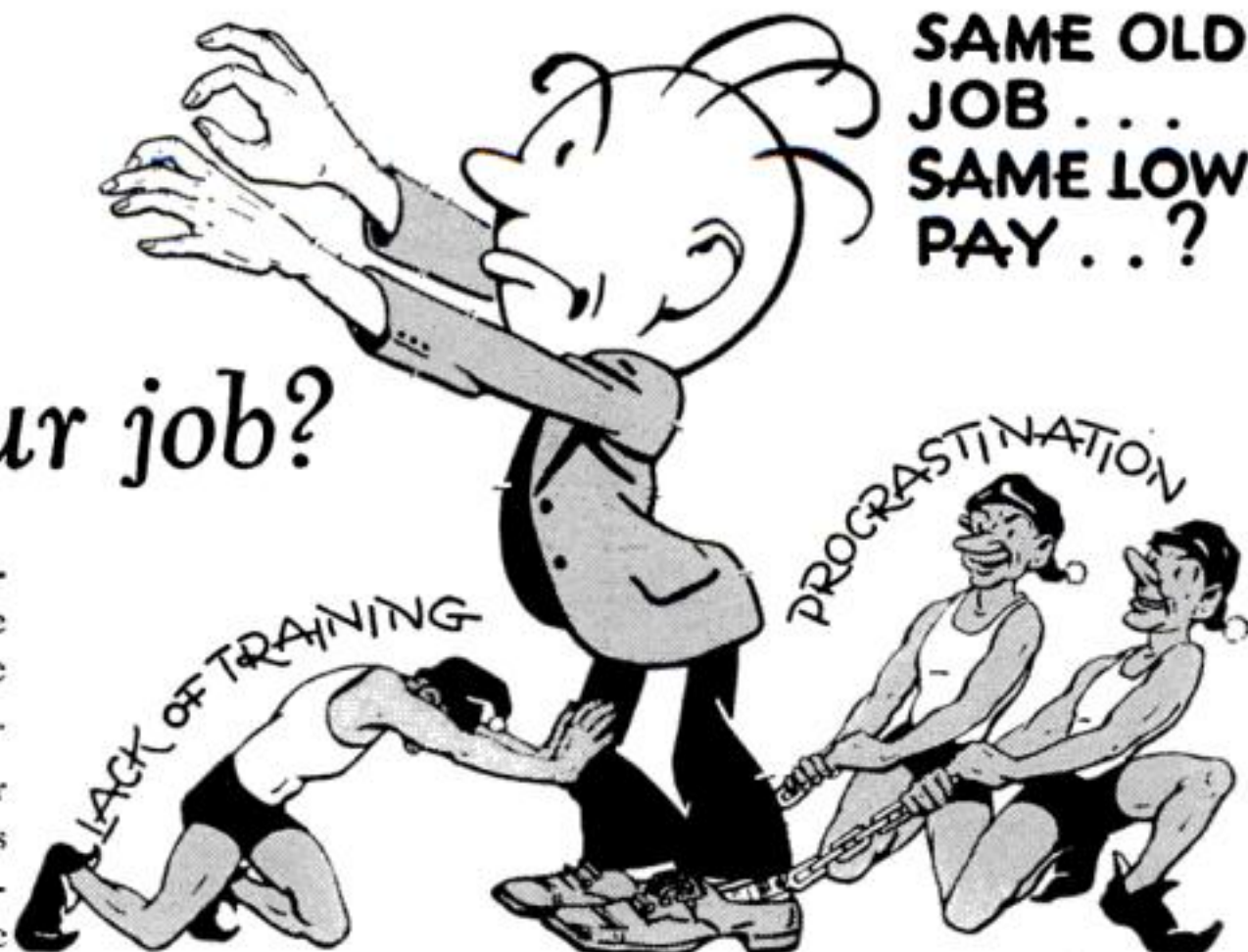
You lose no time from work, and your instructors guide you every step along the way through our famous Practical Problem Method. Low cost—easy terms.

Don't let promotions pass you by—do something **TODAY** about your future.

# LaSalle

**EXTENSION UNIVERSITY**  
A CORRESPONDENCE INSTITUTION

417 So. Dearborn St. Dept. 283X Chicago 5, Ill.



**SAME OLD  
JOB . . .  
SAME LOW  
PAY . . ?**

The coupon below is for your convenience. Simply mark the program in which you are most interested, and mail at once. We'll send you, without obligation, free booklets describing that field together with the opportunities and what you must know to be a success.

ACCREDITED MEMBER, NATIONAL HOME STUDY COUNCIL

### LA SALLE EXTENSION UNIVERSITY, A Correspondence Institution 417 South Dearborn Street, Dept. 283X Chicago 5, Illinois

Please send me your booklet describing the program I have checked below:

#### ACCOUNTING

- ☐ Modern Bookkeeping
- ☐ Basic Accounting
- ☐ Practical Accounting
- ☐ Principles of Acctg.
- ☐ Cost Accounting
- ☐ Federal Income Tax
- ☐ Accounting Systems
- ☐ Business Law
- ☐ Auditing Procedure
- ☐ Controllorship
- ☐ CPA Training
- ☐ Complete Accounting

#### TRAFFIC & TRANSPORTATION

- ☐ Organization & Mgt.
- ☐ Classification, Rates & Tariffs
- ☐ Transportation Agcy. & Services
- ☐ Transportation Law & Regulation
- ☐ Rate Making & Rate Cases
- ☐ Complete Traffic & Transportation

#### LAW

- ☐ Law of Contracts
- ☐ Insurance Law
- ☐ Claim Adjusting Law
- ☐ Law for Trust Officers
- ☐ Business Law I
- ☐ Business Law II
- ☐ General Law
- ☐ First Year Law
- ☐ American Law and Procedure (LL.B. Degree)

#### FOREMANSHIP & PRODUCTION METHODS

- ☐ Foremanship Training

#### STENOTYPE

(machine shorthand)

- ☐ Secretarial

#### SALESMANSHIP

- ☐ LaSalle Sales Training

#### BUSINESS MANAGEMENT

- ☐ Principles of Management
- ☐ Psychology in Business
- ☐ Selling & Sales Management
- ☐ Advertising and Marketing
- ☐ Production Problems
- ☐ Business Financing
- ☐ Credits and Collections
- ☐ Office Management
- ☐ Managing Men
- ☐ Accounting & Statistical Control
- ☐ Business Correspondence
- ☐ Organization & Reorganization
- ☐ Legal Problems
- ☐ Complete Business Management

#### MANAGEMENT COURSES

- ☐ Basic Management
- ☐ Production Management
- ☐ Sales Management
- ☐ Advertising & Sales Promotion
- ☐ Financial Management
- ☐ Personnel Management
- ☐ Sales & Executive Training

Name.....Age.....  
Address.....  
City, Zone, State.....



solvent, even if the container is transparent. And he'd better not loosen that grip with his right hand, either.

HENRY SCARTON JR., Canonsburg, Pa.

### Hot Tip on Hot Wires

... While installing a 110-volt circuit in my garage, the insulated wires came in contact with my hearing-aid receiver. A loud and distinct hum was heard. Curious, I separated the wires and held them individually on the receiver. The hot one sure did sing. The neutral one was silent. Ever since, I've used this method to check for a hot wire.

E. E. STEWART, Plainville, Mass.

### Wishful Thinker Stirs Doer

LAST summer, an I'd-like-to-see-them-make contributor suggested a manually operated light switch on station-wagon tailgates so you could light up the rear without opening a side door.

This sounded like a good idea and I found it easy to do. I bought a second light from the regular dealer—a duplicate of the one in the center of my wagon—

and installed it just inside the tailgate. A few cents more for a few feet of wiring, a couple of hours on a Saturday afternoon, and one of the most convenient features had been added to the car.

It is easily reached from the rear and gives far better light to the cargo than the light at the center of the roof.

PAUL W. PENDELL, Sakbayeme, Africa.

### If a Headlight Conks Out

RECENTLY one of my car's headlights burned out and I snapped on my turn signal. It was a fine emergency measure.

Try it out on a dark, lonely stretch of road, slowing down to 10 m.p.h. or less. It's surprising how much you can see in the brief flashes of light. I found that the right-turn signal is best as it lights up the nearest road edge.

H. J. PLATT, Omaha.

### He Agrees Rewards Are Great

SINCE I've always needed a simple sheet-metal brake, I made the one shown in your November magazine.

Instead of the series of hinges you

CONTINUED

# DON'T DECIDE YOUR FUTURE UNTIL YOU HAVE READ



## How To Make Big Money Fast in the Accident Investigation & Adjusting Field

A. J. Allen earned over \$2,000 in ten weeks. Gary Williams doubled his former salary. Jessie Hill says "Had I not learned of Universal Schools' Accident Investigator Course I would still be just another time card puncher; but today I have a wonderful position, and I receive \$3.00 an hour plus an expense allowance."

RIGHT NOW the Accident Investigation and Adjusting Field offers you a tremendous future. Here's why: *This vital business distributes more money than any other service industry.* Last year alone over 200 MILLION ACCIDENTS had to be investigated for Insurance Companies, Airlines, Railroads, Steamship Lines, and Government Offices — and the need for trained men is booming!

You can investigate full time for one company — or earn \$3 to \$10 an hour in *your own business*. No prior experience or higher education needed. And age is no barrier. Here is a field wide open to men 18 to 60.

## NOW! FREE Book Gives You All the Facts

Send TODAY for new, illustrated Book mailed FREE. Learn how you can prepare at home in just a few weeks for excellent full time or spare time income. See for yourself how others have doubled and even tripled their earnings. Let us show you how Universal Schools has trained hundreds of men in their own homes spare time — and then helped them add thousands of dollars to their incomes. Absolutely no obligation on your part. No salesman will call. Write at once to me, M. O. Wilson, Universal Schools, 6801 Hillcrest Ave., Dallas 5, Texas.

Mr. M. O. Wilson, Dept. PS-2  
Universal Schools, 6801 Hillcrest Ave.,  
Dallas 5, Texas

Send me free book on Big Money in Accident Investigating & Adjusting Field. No salesman will call.

Name.....Age.....

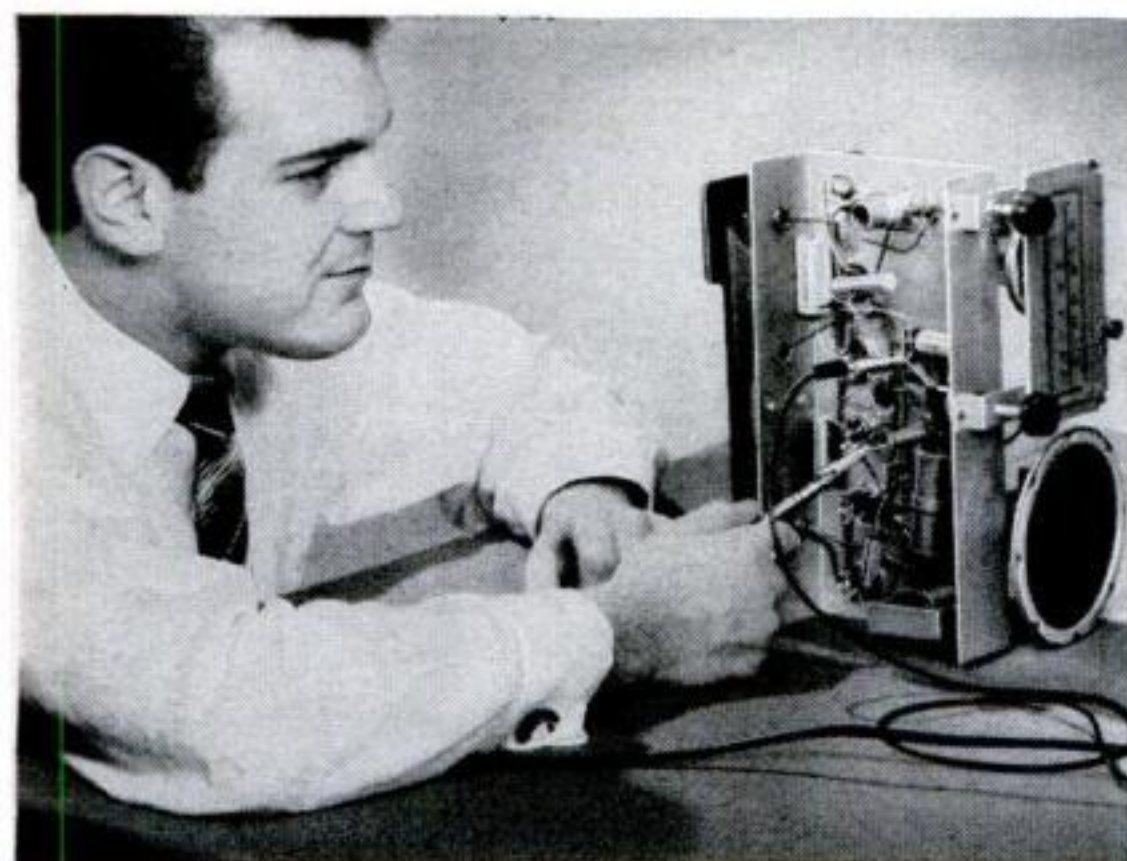
Address.....

City.....Zone.....State.....





# For a Successful Career in Radio-Television Electronics



Train at Home  
in Spare Time  
with N. R. I.  
**OLDEST and  
LARGEST**  
Home Study Radio-Television School

## N.R.I. Trained These Men

**ENGINEER STATION WHPE**  
"Thanks to NRI, I operated a successful Radio repair shop. Now I am an engineer for WHPE."  
VAN W. WORKMAN, HIGH POINT, NORTH CAROLINA



**QUICK SPARE TIME CASH**  
"Knew nothing about Radio-TV when I enrolled. After 15 lessons started repairing sets. My future looks bright."  
DONALD B. ACKERMAN, MINNEAPOLIS, MINNESOTA



**HAS OWN TV BUSINESS**  
"Quit my job to do Television work full time. I love it and do all right financially."  
WILLIAM F. KLINE, CINCINNATI, OHIO



## Prosperous Fast Growing Industry Offers You GOOD PAY-BRIGHT FUTURE-SUCCESS

It's the trained man who gets ahead—gets the better job, drives a better car, lives in a better home, is respected for what he knows and can do. For a job with a future—find out how you can train at home for Radio-Television.

### TODAY'S OPPORTUNITY FIELD

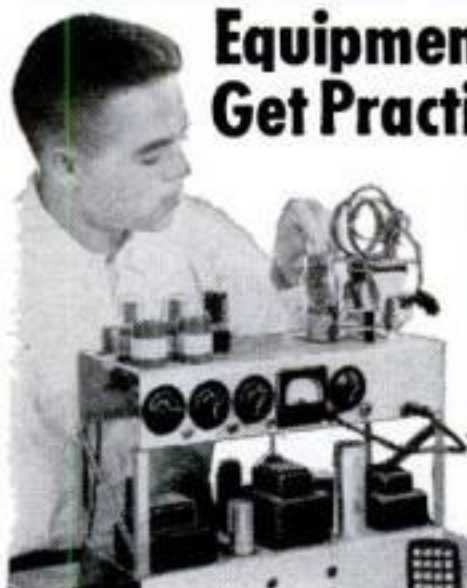
Training PLUS OPPORTUNITY is the ideal combination for success. And today's OPPORTUNITY field is Radio-Television. Over 125 million home Radios plus 30 million sets in cars, plus 40 million TV sets mean big money for trained Technicians. More than 4,000 Radio and TV broadcasting stations offer interesting and important positions. Color television, portable TV sets, Hi-Fi, assure future growth. Find out about NRI. Since 1914—for more than 40 years—NRI has been training ambitious men

at home in spare time for Radio-TV. With NRI 50-50 method, you study basic principles AND learn by practicing with actual equipment NRI furnishes. You learn with your hands and your head. You get dependable training, backed up by the reputation of the oldest and largest home study Radio-TV school.

### ADD TO YOUR INCOME SOON \$10-\$15 A WEEK IN SPARE TIME

Soon after enrolling many start earning extra money fixing sets. Many open their own full time Radio-TV shops after getting NRI Diploma. MAIL COUPON. Get FREE Sample Lesson and 64-page Catalog showing equipment supplied, outlines of courses, opportunities in Radio-TV. Price is low—terms easy. Address: NATIONAL RADIO INSTITUTE, Dept. OBB, Washington 16, D. C.

## Without Extra Charge NRI Sends Equipment You Need to Get Practical Experience



Nothing takes the place of practical experience. That's why NRI training is Learning-by-Doing. With Servicing Course you build Radio shown at top and other equipment. With Communications Course you build Transmitters at left and other equipment. Catalog shows all equipment you get.

Available To  
**VETERANS**  
Under G.I. Bills



## SAMPLE LESSON AND CATALOG FREE

### MAIL COUPON TODAY

**National Radio Institute**  
Dept. OBB, Washington 16, D. C.

Mail me Sample Lesson and 64-Page Catalog FREE. (No salesman will call. Please write plainly.)

Name \_\_\_\_\_ Age \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

ACCREDITED MEMBER, NATIONAL HOME STUDY COUNCIL





**EASY TO APPLY.** PLIOBOND requires no mixing, brushes on, dries rapidly.

**EXCELLENT ADHESION.** PLIOBOND exhibits exceptional strength — up to 1600 lbs./sq. in. in shear tests.

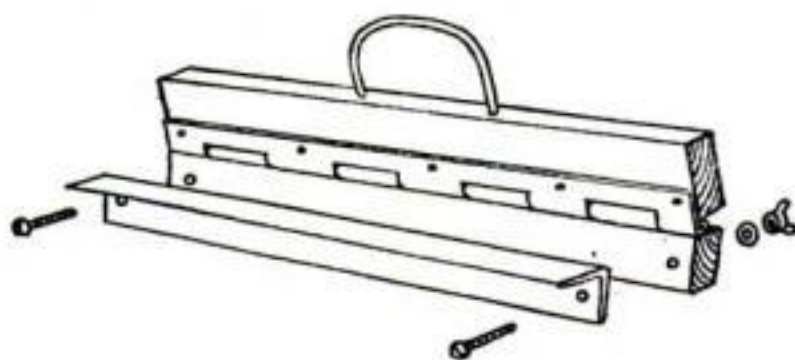
**EXTREMELY DURABLE.** PLIOBOND resists age, heat, cold, water, chemicals, oils.

**Pliobond**  
BY  
**GOOD YEAR**

Pliobond — T. M. The Goodyear Tire & Rubber Company, Akron, Ohio



suggest, I used a piano hinge for greater strength and accuracy. I also substituted an angle iron for the front jaw and mounted it to the back jaw with  $\frac{1}{4}$ "-20



screws and wingnuts. Thus I don't need the vise or the C clamp to hold the work. By cutting the holes in the center of the end, you can turn over the bar to make a fold greater than 90 degrees.

All in all, I'm very happy to have seen this simple brake. I've made several projects with it, including a 50-drawer parts rack fashioned after the plastic ones I have in my camera-repair shop.

IRVING FRIEDMAN, Bronx, NYC.

#### How Do You Measure 'Em?

You say the proposed Staten Island-Brooklyn bridge will be the world's longest suspension bridge ["Picture News," Nov.]. I am afraid this will not go down so well with the Mackinac Bridge Authority, because the "Mighty Mac" is 8,614 feet long. That's 1,924 feet longer than your candidate.

However, the center suspension span of the N. Y. bridge (4,260 feet) will be longer than those of the Mackinac (3,800 feet) and the Golden Gate Bridge (4,200 feet).

AJIT VAIDYA, Columbus, Ohio.

#### How to Discourage Starlings

I HAVE the answer for any PS readers who want to keep starlings from edging out other birds. We have two bird feeders set up on posts. They bring in all sorts of small birds, but I believe I've rid our five acres of ground of all starlings.

I made a wooden frame of lath for each feeder. The frame is just square enough to fit under the aluminum lid, and the laths are spaced just far enough apart so that the smaller birds can get under and in to the food. After I put these up, the starlings for a while tried in every way to get at the food, but couldn't reach it. I even saw some looking underneath to see if there was another way. Finally,

CONTINUED



# Make More Money Soon Fixing Electric Appliances



**Actual Lesson  
FREE** Fast Growing  
Field Offers  
Good Pay, Security  
Interesting Work

## Learn at Home in Spare Time

Earn more money. Enjoy doing important, interesting work. Learn Electrical Appliance Servicing. This is a field of increasing opportunity. Today every wired home has many electrical appliances and millions and millions of new appliances are made and sold each year. Find out more about this great, growing field. Find out how NRI can train you, at home and in spare time to be an Appliance Service Technician. See how you can start soon to make extra money servicing appliances.

## Add to Your Income Soon After Enrollment Opportunities Increasing for Service Technicians

NRI Training is practical, thorough. You get easy-to-understand lessons, and NRI supplies parts to build professional type Multi-Use Tester. Use it to get practical experience. Soon, you can add to your income by servicing appliances. Build a profitable *sideline* for your spare time—qualify for a good job—develop a business and be your own boss. As an Appliance Service Technician, your opportunities are broad—your services wanted, gladly paid for, highly regarded in your community.

Appliances are necessary to comfortable, convenient living. Owners pay well to keep them in repair. The field is amazingly big. In addition to major appliances such as electric ranges, air conditioners, refrigerators, there are over 40,000,000 electric irons, 5,000,000 electric blankets, 15,000,000 coffee makers, plus more millions of vacuum cleaners, fans, toasters, mixers, etc.



## Learn and Earn With Tester Diploma When You Finish

Locate appliance troubles easily with Portable Appliance Tester you build. You use it to learn and do actual electric appliance repair jobs. For only \$3.00 with enrollment and \$6 per month, get training including Tester—a small price to pay for increased earnings. Mail coupon for Sample Lesson and Book—your first step toward more interesting work, bigger earnings. **NATIONAL RADIO INSTITUTE, Dept. BBO, Washington 16, D. C.**

**TESTING APPLIANCES FOR  
ELECTRICAL TROUBLES**

NATIONAL RADIO  
WASHINGTON, D. C.

Over 40 Years  
Experience  
Backs Up  
NRI Training

*How to Learn*  
**SERVICING  
ELECTRICAL  
APPLIANCES**

**Find Out What  
Appliance Repair  
Offers You**

## Mail Coupon FOR LESSON AND BOOK **FREE**

**National Radio Institute**

Dept. BBO, Washington 16, D. C.

Please send me Electric Appliance Servicing Lesson and Book FREE. (I understand no salesman will call.)

Name \_\_\_\_\_ Age \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

ACCREDITED MEMBER NATIONAL HOME STUDY COUNCIL



# "Why should I worry about my battery—

*I've got  
warning  
lights!"*



Warning lights for your battery and oil pressure are not enough! Your car needs a Stewart-Warner "Twin Gauge" Panel. Here's why: A generator warning light indicates only that your generator is not delivering a charge. But the ammeter in the "Twin Gauge" Panel tells actual rate of current flow...helps prevent generators from burning out and overcharging or discharging of battery. And the Stewart-Warner Oil Pressure Gauge in the Twin Panel tells exact oil pressure, helps assure safe engine operation. Choice of standard black enameled steel as illustrated or deluxe panel of Colonial White grain finish Royalite.

Ask for it at your service station,  
garage, or automotive parts store.



1840 Diversey Parkway, Chicago 14, Illinois

the setup so discouraged them that we haven't seen one starling around our place for several months.

HARRY TORNQUIST, Harbert, Mich.

## Wail from an Old-Car Fan

I HAVE a few words to say about the Tom Henderson cartoon showing a draped car [Nov.] with the underline: "Jim's so ashamed of our old car."

Anyone who owns an old car such as the one pictured is mighty lucky. I know



I'd give my right arm to catch hold of one. Really old cars are rare and, when found, usually quite expensive. So if I were Jim, I would be very proud.

STEPHEN BLUCHER, Detroit.

*The wife misunderstood. He was covering it to prevent weathering.*

## Honest, It Works

AFTER studying "A Wiring Trick that Saves Wire" [Nov.], I wonder if the diagram on page 159 is supposed to show on-off operation of two outside lights with control by two switches? That's quite a trick, but it will work only if you eliminate the light on the porch.

SGT. L. SLEPIN, USMC, Olathe, Kan.

... I'D SAY you're implying something not true in your wire-saving hookup. Namely, that the lights can be turned on or off from either switch at any time. The lights, when on, can be turned off from either switch; but they must be turned back on by the switch that turned them off.

JAMES WAITE, Nampa, Idaho.

... SEEMS to me you missed a possibility. Your wiring diagram would also permit one or more post lights between house and garage, as well as simultaneously controlling both entrance and garage lights.

F. G. MCCOLLISTER, Clarksburg, Ohio.

... MY GARAGE has an unswitched out-



*Low-Priced Dodge Dart Features Revolutionary New Engine*

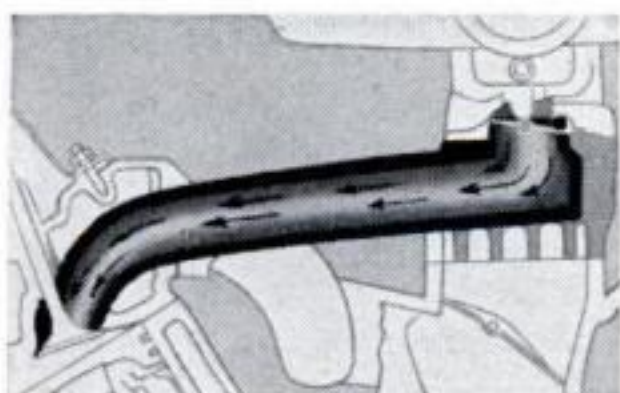
# New Economy Slant "6" Uses Exclusive Semi-Ram Intake Manifold!



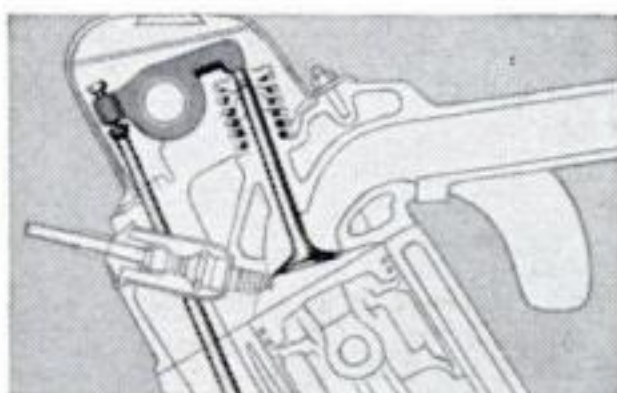
**New design  
features  
inclined block  
with new  
Equi-flow fuel  
induction, over-  
head valves,  
for greater  
fuel economy.**

Packing surprising performance with the kind of gas mileage usually found only in much smaller cars, this new Economy Slant "6" represents a major breakthrough in engine design. The 225 cu. in. block is angled 30° to the side to allow for special free-breathing intake and exhaust manifolds. High-turbulence

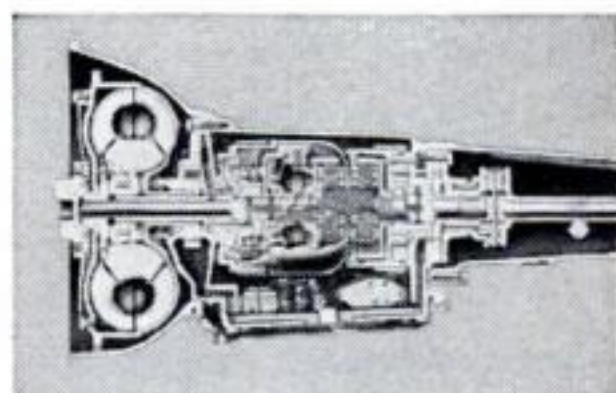
wedge-shaped combustion chamber and carefully selected 8.5 to 1 compression ratio deliver 145 h.p. at 4000 r.p.m., using regular gas. Special high-efficiency camshaft puts top torque right down in useful driving ranges. Output: 215 lb.-ft. at 2800 r.p.m. Uses new velvet-smooth Free-Flight Power engine mounting.



Special slant-block makes room for this new semi-ram intake manifold. Exclusive Equi-flow design provides more efficient, evenly balanced distribution of fuel to all cylinders.



Big, overhead valves mean better breathing, better distribution of fuel mixture inside cylinders. More even burning means extra power and mileage from every gallon of gas.



Special TorqueFlite Six is the first automatic transmission designed specifically to match the power-torque curve of a six-cylinder engine. (Optional at extra cost.)

AMERICA'S FIRST FINE ECONOMY CAR

# DODGE DART



NOW DODGE BUILDS TWO GREAT CARS: DODGE DART • '60 DODGE



## Be a Top-Pay-Man in the Fast-Growing **AIR CONDITIONING AND REFRIGERATION FIELD**



YOU BUILD A  
REFRIGERATOR  
FREEZER  
AIR CONDITIONER  
OR MILK COOLER

YOU PRACTICE WITH  
25 BIG KITS

TRAIN AT HOME

**THAT BETTER JOB or A BUSINESS OF YOUR OWN** is within your reach. Opportunities are *plentiful* in the air conditioning and refrigeration field. Although old and established, this industry is booming. Today, over 150 million units are in use. Last year, 3 million refrigerators, 1 million freezers and two million air conditioners were sold.

**THOUSANDS OF MECHANICS ARE NEEDED** to keep these units in working order. Trained men earn up to \$150 a week and more...and work steady. So, why saddle yourself with low income when you can enjoy a better job, better pay, better living? *To find out how, just fill out and mail coupon. Do it now.*

### CTI TRAINS YOU AT HOME IN A FEW MONTHS

You get practical training along with real experience because CTI sends you 25 big kits. You assemble a heavy-duty, commercial-type, 1/4 h.p. high-side (illustrated above). You run many tests, do 10 complete trouble-shooting and repair jobs. You build and keep an air conditioner, freezer, refrigerator or milk cooler. Only CTI sends you this equipment—at no extra cost. Easy picture lessons make training easy.

### EARN CASH AS YOU LEARN

Soon after you enroll, use your newly-acquired skill to do repair jobs in your community. Earn extra cash. Some students make up to \$15 a week and more—others open a shop. Mail coupon now!—Commercial Trades Institute, 1400 Greenleaf Ave., Chicago 26.



**FREE! 2 BOOKS!**

**COMMERCIAL TRADES INSTITUTE**

1400 Greenleaf Ave., Chicago 26, Ill.

Dept. R-689

Mail me new **SUCCESS BOOK** and **SAMPLE LESSON**. No cost or obligation.

Name \_\_\_\_\_ Age \_\_\_\_\_

Address \_\_\_\_\_

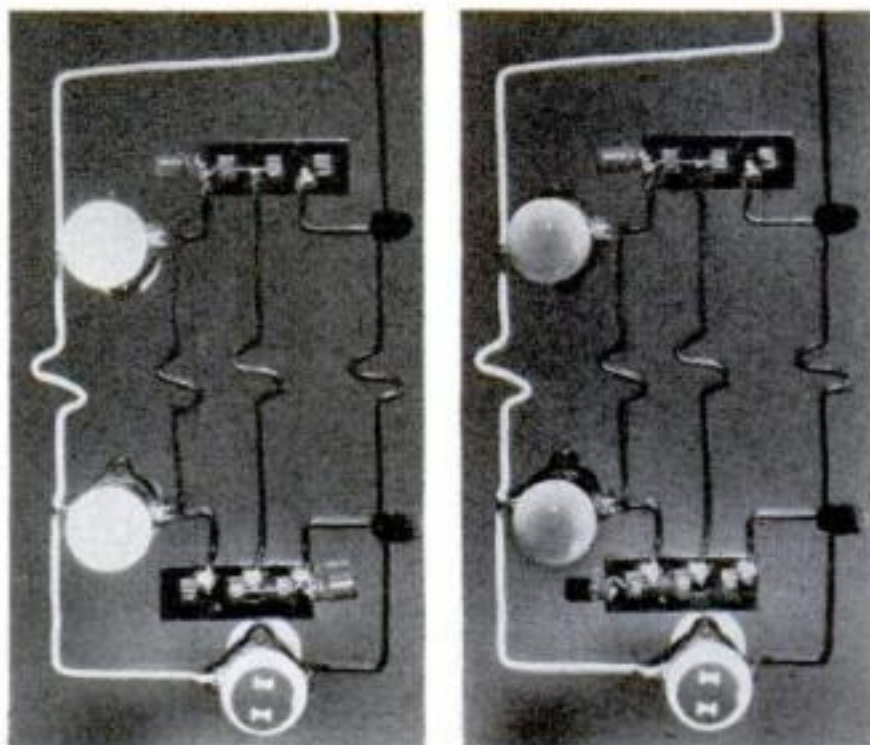
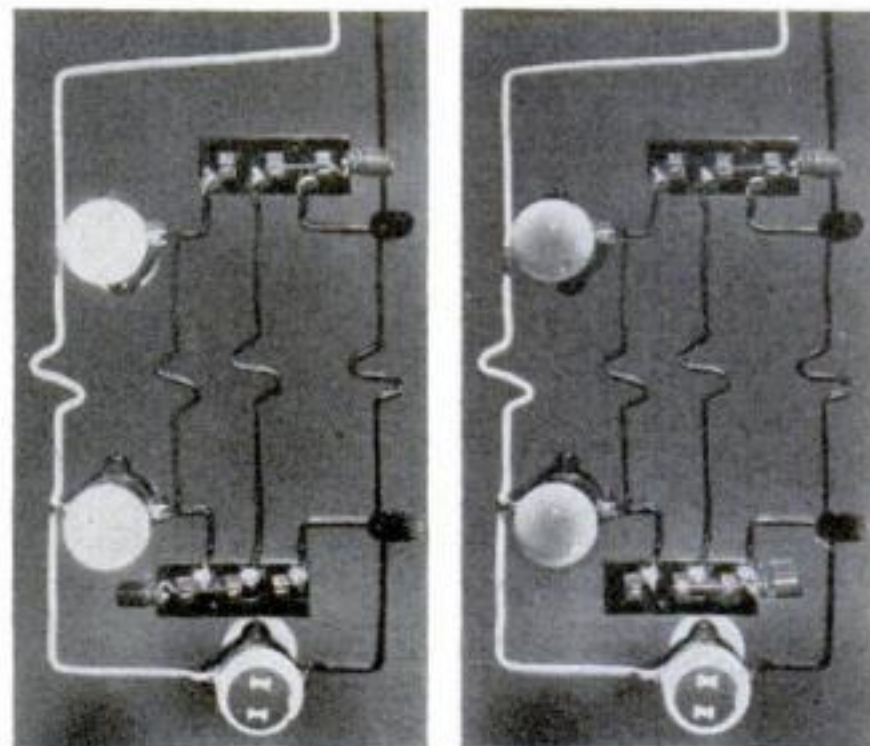
City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

Accredited by National Home Study Council

let, plus two-way switches for controlling the garage light, all accomplished with only three wires. The third wire used for light control reverses polarity, depending on how the switches are thrown.

H. J. GRIEF, San Angelo, Tex.

1. *Either switch in the circuit has OFF and ON control of both lights—see pho-*



*tos of circuits in all possible positions. Remember that house-wiring switches have snap action with no dead center.*

2. *Post lights could be tied in anywhere along the line.*

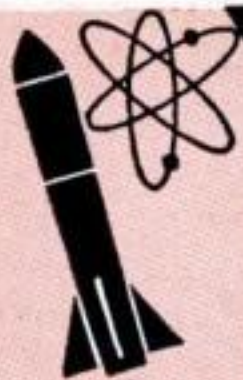
3. *Reader Grief may come to grief unless he has found out how to sidestep code rules against switching a ground leg, how to prevent dead shorts, and how to avoid a tingling sensation in the switch finger with possibly lethal results.*

### No Upside-Down Cars on Mirror

I WAS interested in the periscope for autos ["Detroit Report," Nov.] because I had a similar idea for gaining a decent

CONTINUED





In Spare Time at Home—Prepare for a Better Job—or  
Your Own Business in One of the Many Branches of

# ELECTRONICS

You build and keep this valuable Vacuum Tube VOLT-METER



You build and keep this 5-inch COLOR OSCILLOSCOPE—almost a "must" for TV servicing.



**HOME MOVIES . . .**  
... make important points crystal clear. Speeds your learning. It's almost like having an instructor at your side!

**MILITARY SERVICE**  
If you are subject to military service, the information we have should prove very helpful. Mail coupon to-day.

**COLOR TV**  
DeVry Tech's program also includes training in Color Television



**21 INCH**

Build and keep this BIG DeVry Engineered TV set—easily converted to U.H.F. (DeVry offers another home training, but without the TV set.)

## RADIO - TELEVISION - RADAR

If you are seeking a better job or a business of your own, the appealing field of Television-Radio-Electronics offers **REAL PROMISE!**

In this fast-growing field, trained Electronic technicians find many good-paying, interesting jobs in manufacturing, installing, operating, servicing. Equally important is the fact that these are **GOOD JOBS**—offering the kind of a future that an untrained man often dreams about.

No previous technical experience or advanced education needed. Prepare for this profitable field in your spare time at home, or in our modern Chicago or Toronto Laboratories. Nothing else like it! Send for **FREE** details.

### EARN WHILE YOU LEARN

After you get part of DeVry Tech's training with equipment at home, you may then in your spare time, begin to earn real money servicing Radio and Television sets.

## Your GUIDE

### to Profitable Job Opportunities

TV-Radio Broadcast Technician  
Color Television Specialist  
Radar Operator • Laboratory Technician  
Airline Radio Man • Computer Specialist  
Quality Control Manager  
Your Own Sales & Service Shop  
... **PLUS MANY OTHERS**

## YOU GET THE SAME EMPLOYMENT SERVICE

that has helped thousands of our graduates toward fine careers in Electronics.



Send for **FREE BOOKLET TODAY!**

Accredited Member of National Home Study Council

"One of North America's  
Foremost Electronics  
Training Centers"



**DeVRY TECHNICAL INSTITUTE**

CHICAGO 41, ILLINOIS



You work over  
**300**  
Learn-By-Doing  
projects

Build over 300 practical projects from many shipments of Radio-Electronic parts. You build and operate TV-Radio circuits ... wireless microphone ... and many other major projects—all designed to provide outstanding practical experience at home.

**ACT NOW!** Get information-packed publication **FREE!** Mail coupon today.

### DeVRY TECHNICAL INSTITUTE

4141 Belmont Ave., Chicago 41, Ill., Dept. PS-2-Q

Please give me your **FREE** booklet, "Electronics in Space Travel," and tell me how I may prepare to enter one or more branches of Electronics.

Name \_\_\_\_\_ Age \_\_\_\_\_

PLEASE PRINT

Street \_\_\_\_\_ Apt. \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

Canadian residents address DeVry Tech of Canada, Ltd.  
626 Roselawn Ave., Toronto 12, Ontario

2044



# It's Like Having Factory Experts Right Beside You...



## SHOWING YOU HOW TO FIX ANY PART OF ANY CAR

Now — Whether You're a Beginner or an Expert Mechanic — You Can "Breeze Through" Any Repair Job— QUICKLY — EASILY — RIGHT!

THERE'S ONE SURE WAY to "lick" any auto repair job — that's to get the advice of a real auto expert. MOTOR'S Auto Repair Manual brings you this expert guidance from the engineers who make the cars and know them "inside out." Yes, you get the "know-how" from 176 OFFICIAL SHOP MANUALS — boiled down into one giant volume!

No guesswork! MOTOR's Manual "starts from scratch" — leads you through entire job with easy step-by-step directions, clear "how-to" pictures. You CAN'T go wrong!

### 1,100 BIG PAGES—2,850 PICTURES

Brand-new edition covers all popular American car models 1953 thru 1960—from simple tune-ups to stripping rear-ends! Over 1,100 Giant Pages, 2,850 This-Is-How Pictures, 195 Quick-Check Charts, 30,000 essential repair specifications. Over 225,000 service and repair facts PLUS Giant TROUBLE-SHOOTING SECTION that spots any of 2300 car troubles in a jiffy! Over 3 Million copies sold!

### Same Free Offer on NEW TRUCK REPAIR MANUAL

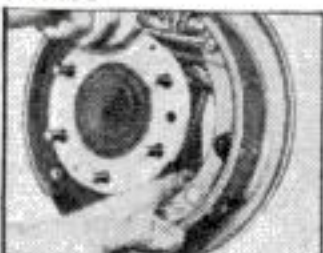
Covers every job on every popular gasoline-powered truck made 1952-1960 plus GM, Mack and Cummins Diesels.



**TRY BOOK FREE 7 DAYS** — Send no money. Just mail coupon (paste on postcard for FAST action). Use Manual for whole week, free. If not greatest time and money-saver you've ever seen — return book in 7 days and owe nothing! Mail coupon TODAY to: MOTOR Book Dept., Desk 022, 250 W. 55th St., New York 19, N. Y. (Schools, Bookstores: write for discounts.)



ALL AUTOMATIC TRANSMISSIONS fully covered.



More than 2800 pictures make every operation easy as ABC.



Diagrams, tables, text take "mystery" out of ignition systems.

### MAIL COUPON NOW FOR 7-DAY FREE TRIAL (Attach to postcard for fast action)

#### MOTOR BOOK DEPT.

Desk 022, 250 W. 55 St., New York 19, N. Y.

Rush to me at once (check box opposite book you want):

- ☐ MOTOR'S New AUTO REPAIR MANUAL. If O.K., I will remit \$2 in 7 days, \$2 monthly for 2 months and a final payment of \$1.95 (plus 45c delivery charges) one month after that. Otherwise I will return the book postpaid in 7 days. (Foreign price, remit \$10 cash with order.)
- ☐ MOTOR'S New TRUCK REPAIR MANUAL. If O.K., I will remit \$3 in 7 days, and \$2 monthly for 3 months, plus 45c delivery charges with final payment. Otherwise I will return book postpaid in 7 days. (Foreign price, remit \$11 cash with order.)

Print Name..... Age.....

Address.....

City..... Zone..... State.....

☐ Check box and save 45c delivery charge by enclosing WITH coupon in envelope entire payment of \$7.95 for Auto Repair Manual (or \$9 for Truck Repair Manual). Same return-refund privilege.

field of rear vision. (Detroit should be ashamed of that little bit of reflector they put on \$3,000 worth of merchandise.)

This, I thought, would be an improvement—until I checked and found that two simple mirrors (as shown in your illustration) would make the following car appear to be upside down. This would take a lot of getting used to!

R. U. STRASSER, Skokie, Ill.

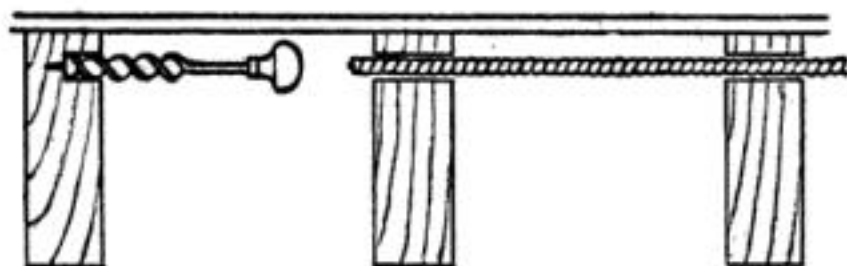
... PERISCOPES for cars may be feasible but, as illustrated, wouldn't the driver see everything behind him upside down?

E. ROBIDOUX, Los Angeles.

Right. Two flat mirrors wouldn't work. But, in its simplest form, the car scope uses three optical elements. There is an objective lens—cylindrical on one surface and flat at the other—at the rear opening of the roof tunnel, a plane mirror at front to reflect the light down at a small angle, and a concave cylindrical driver's mirror.

### His Brace Is a Doorknob

WHY make angled holes in studs or joists when boring to string electrical cable ["Short Cuts and Tips," Oct.]? It's a lot simpler to make straight holes up near the flooring. You get a neater job and you don't weaken the joist as much. With a sharp bit and a doorknob for a



brace, holes can be bored in line even in close quarters.

W. C. McCANSE, Springfield, Mo.

### Motors, Not Electric

WE READ with considerable interest your article "Hole to Probe Mysteries Inside the Earth" [Nov.]. We'd like to offer one correction, however.

You mention an offer from "General Electric to lend a million dollars' worth of diesel-electric generating equipment." Actually, such an offer was made by the Electro-Motive Division of General Motors at the annual research conference sponsored by the Southern Research Institute in Birmingham, Ala.

ROBERT D. INNES

General Motors Corp., LaGrange, Ill.



# The STUDY of LAW

## A "Must" for the ambitious man seeking Business Success!

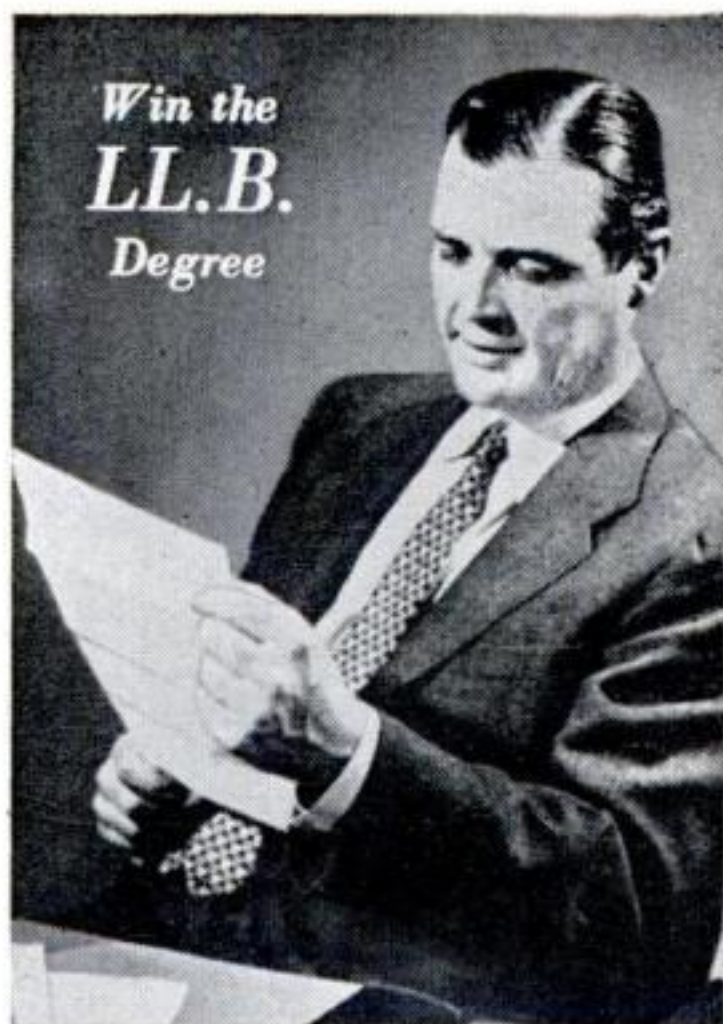
... Can **YOU** answer these legal problems?

**CASE #1** Jones wrote Smith making an offer. Smith wrote his acceptance and mailed it. Then he decided to call it off and telegraphed Jones to that effect. Jones got the telegram before he did the letter. May he hold Smith to the contract?

**ANSWER.** Yes. Both Smith and Jones became bound when the letter containing the acceptance was mailed.

**CASE #2** Doe said to Crane, "I will sell you 100 shares of XY stock at \$50." Crane said, "I'll give you \$45." Doe, knowing the market was unsettled, said nothing, but an hour later tendered 100 shares and a bill for \$4,500. May he hold Crane?

**ANSWER:** No. Crane's counter-offer was a rejection of Doe's offer.



## Law... A FASCINATING STUDY AND A LIBERAL EDUCATION

Law today is involved in practically everything we do—regardless of what our position or status in life may be. That's why thousands of ambitious men and women who never intend to practice are studying Law with LaSalle in spare time—not for a legal career but as an aid to business advancement.

Whether your work is related to banking, insurance, advertising, credit or collections, transportation, accounting, claim adjusting, merchandising, store proprietorship, partnership, brokerage, manufacturing—ANY FIELD—you need to understand and know Law.

The study of Law is a great help to men in every walk of life. Many physicians, clergymen, and other professional men are now studying Law with LaSalle as a matter of recreation, mental training, culture, as a necessary part of a liberal education.

Aside from the actual knowledge that you acquire, the reading of Law is conceded to be a superior developer of reasoning power. For all types of work, Law training develops keen, clear, quick, correct and decisive thinking. Reading a Law text is much more interesting to most people than a fiction story—you'll be learning the underlying principles of man's relation to society, his rights, privileges, and restrictions toward himself and his fellow man.

### STUDY AT HOME—IN SPARE TIME

You can study American Law and Procedure right in your own home—advancing at your own pace. For over 50 years we have helped more than 1,400,000 ambitious men and women to greater success in the business world. You too can benefit, as have so many before you. Low cost—easy terms.

The training includes the 14-volume LaSalle Law Library—American Law and Procedure. This library has been compiled by leaders in the field of Law. It covers the whole basic field of Law in an orderly and easily understood manner that can be quickly learned. Collateral reading and printed lectures on legal problems supplement the text. Law instructors who are licensed attorneys personally supervise your program from the first assignment to the LL.B. Degree or Diploma.

### SEND FOR TWO FREE BOOKS, "LAW TRAINING FOR LEADERSHIP" and "EVIDENCE"

If you are determined to enjoy the advantages of Law training—to prepare for greater future possibilities—send the coupon and get all the facts. The interesting and informative booklets, "Law Training for Leadership" and "Evidence" will be sent promptly, and without obligation. MAIL THE COUPON TODAY!

Accredited Member, National Home Study Council



A MOST UNUSUAL LAW LIBRARY

## SEND FOR FREE BOOKS

### OTHER LASALLE OPPORTUNITIES

- ☐ Accounting
- ☐ Traffic and Transportation
- ☐ Business Management
- ☐ Stenotype (Machine Shorthand)
- ☐ Modern Bookkeeping
- ☐ CPA Training
- ☐ Salesmanship

### LaSalle Extension University — A Correspondence Institution —

Dept. 283LR 417 S. Dearborn St., Chicago 5, Ill.

Please send me, free of all cost or obligation, your latest illustrated booklets "Law Training for Leadership" and "Evidence."

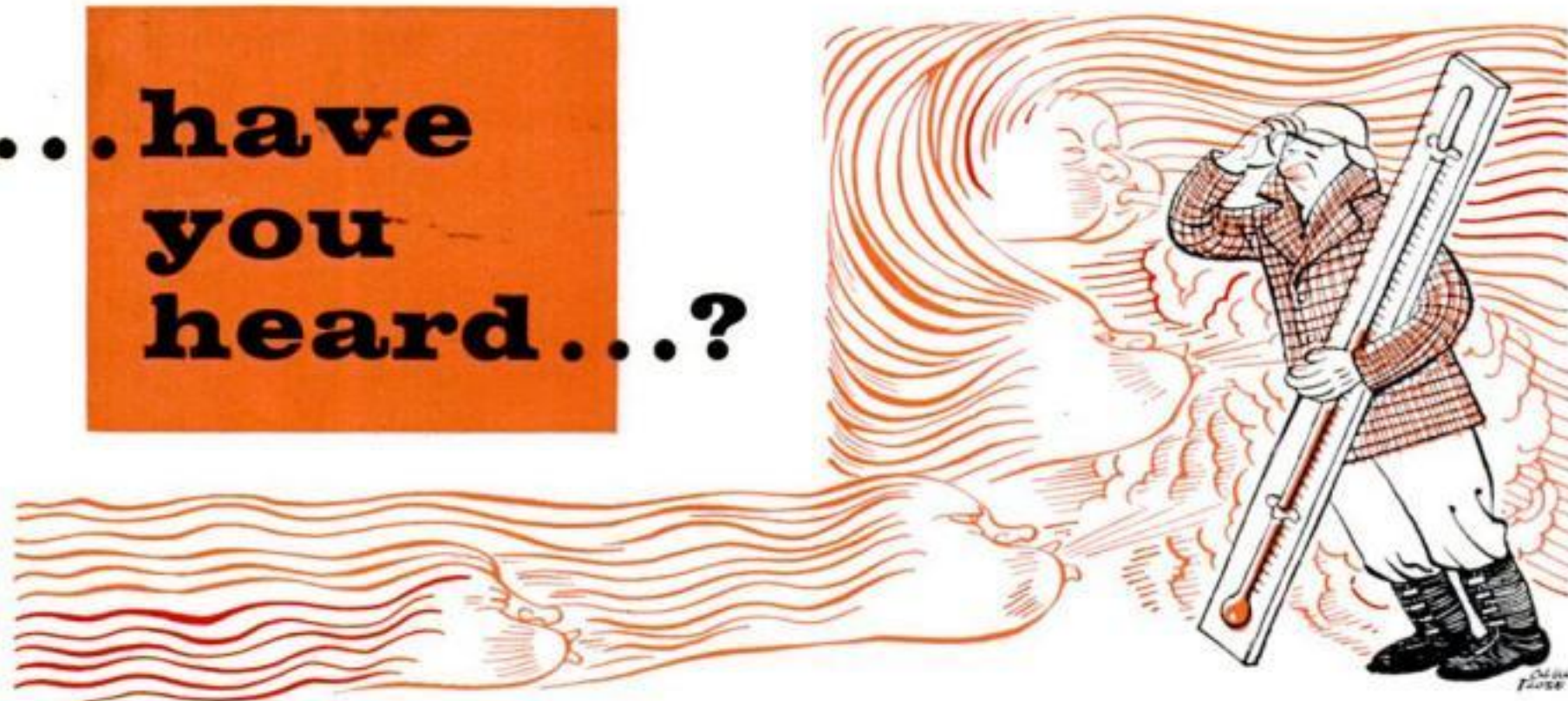
Name..... Age.....

Address.....

City, Zone, State.....



...have  
you  
heard...?



**It's colder out than you think**—if there's a wind howling as well as an icy dip in temperature. Your skin, normally at a temperature of 91.4 degrees F., loses heat much more quickly when there's a wind fanning it. You end up as chilled on a warm but windy winter's day as you do

on a day when the thermometer's really nose-dived, but when there's been no blast. Army medical researchers now stress both factors when studying the endurance of soldiers in cold climates.

The difference wind makes is startling: A 20-m.p.h. wind at a temperature of 34 degrees F., for example, will cause the same heat loss from your skin in an hour's time as a temperature of 38 below—with no wind.

Credit for the new look at the weather goes to Dr. Paul A. Siple, who collected the data in Antarctica.

To use the chart:

1) Find the column with the heading showing current wind speed.

2) Read down until you find the figure closest to current temperature.

3) Read across to the entry in the "0" column. This is the equivalent temperature if there were no wind.

TEMPERATURE (degrees F.)	WIND SPEED (miles per hour)										
	45	35	25	20	15	10	5	3	2	1	0
	90	89½	89	88½	88	87¾	87½	87	86	84½	83
	82	81	80½	80	79½	78	76	74	72½	70	60
	72	71	69½	68	67	65	60	57	53½	47½	23
	63	61	59	57	55	52	44½	39	34½	20	-11
	51	49	47	45	42½	38	28	18½	11	0	-27
	41	39	36	34	30½	25	11	0	-9	-23½	-38
	30	28	25	23	18	11	-5	-16½	-40	Below -40°	
	20	18	14	11	6	-2	-19	-40			
	10	7½	3	0	-6	-15	-35				
	0	-2½	-8	-12	-18	-29					
	-11	-14	-18	-23	-30						
-21	-24	-30	-35								
-32	-35	-40	-40								

Source: U. S. Army Medical Research Laboratory

## Do you ever get "velocititis"?

That's the word Columbia University's Safety Institute researchers coined to mean the loss of sense of speed that makes driving at 60 m.p.h. seem like 40, and slowing to 25 to make a highway exit seem as if the engine is stalling.

Nobody's immune to "velocititis," or to another evil—the hypnosis induced by long, dull stretches of highway, says Dr. James L. Malfetti, the Institute's direc-

tor. So it's not fair to blame "lack of driver education" for accidents that are not the driver's fault. There are inherent limitations that no one can overcome. To compensate, designers and highway engineers ought to build more safety into the car and onto the road.

For cars, Dr. Malfetti feels, the ultimate solution is electronic controls—automatic devices that would be coordinated with the known abilities of the driver:



# FACTORY OVER STOCK SALE!

**Must MOVE OUT Merchandise—Including Items BELOW COST!**

## Cigarets—8½ a Pack!

Enjoy cigarettes as good or **BETTER** than the brand you now smoke, yet pay—**NOT 29c**—but only **8½c** a pack! The Korium Cigaret-Maker is a little "home factory" that cranks out **THOUSANDS** of cigarettes. Precision-made. Follows, in essence, same principles as \$100,000 machines used in Va., N. Car., etc. Remember, you can't smoke taxes—so why pay for them. Join the thousands of Americans—bankers, clerks, housewives, etc.—who now manufacture their own custom-blend cigarettes and saving over **TWO-THIRDS** on every pack! Try the Korium Cigaret-Maker 10 days—see how it's exclusive Conveyor Belt hands you a cigarette every 2 seconds! Comes complete—ready to use. Thousands sold at \$4.98—**NOW ONLY \$1.25**. Order by No. 851.



Orig. \$4.98  
NOW CUT TO  
**1.25**

**THORESEN, Inc., Dept. 7-B, 585 Water Street, New York 2, N. Y.**



## HEAVY-DUTY SLINGSHOT

Built-in Range Finder  
**1.25**

Extra-thick quadrangular slings with 44 lb. pull! Kills small game, routs pests. Use for target practice. Packs wallop! Special cross-bar range finder assures greater accuracy. Same type used on cameras, rifles. Thick leather pouch. Brass riveted slings. Ebony finish wood. Super silent. Hits like rifle! **FREE! 100 Killer Steel Pellets. No. 943 Slingshot & 100 pellets \$1.25. Extra Pellets: 400 for \$1.** [Not sold to N.Y.C. residents]

## STORM WINDOWS



ORIG. **19½c**  
**49c**

Transparent like glass yet can't shatter, chip, peel or rattle. Non-porous. Won't crack even at 53 below! Install in minutes. No nails, screws or tools. No installation costs. Cut to fit window press on with Adheso border Tape. That's all. When winter's over, fold away for next year. 5 million used in U.S., Canada, Alaska. Shipped flat in rolls measuring 36"x432" for 10 windows. 90-foot Adheso Border Tape **FREE**. No. 74 Kit of 10 Plastic Storm Windows **\$1.98** plus 22c mailing. Total: \$2.20 2 kits (20 windows) **\$3.99**. Sold in Kits Only!

## Pumps 300 Gals. PER HOUR

**2.98**



**Needs No Electric Motor! Can't Break Down!** This is one of the most ingenious low-cost pumps we've ever seen. Pumps up to 300 gallons per hour—**WITHOUT** electricity! Without a motor! And it can't break down! Merely attach to any faucet and turn on—water pressure does the rest. You spend not a penny for electricity or gasoline. Use it in cellar, backyard, pool, sinks, excavations, fish tanks—when ever you want to drain water **FAST!** No. 491 Drain Pump—**\$2.98**. Works on water pressure!

## Human Skeleton Model WALKS!

In scale to 6-FT. MAN! **1.98**

- ★ Unbreakable Materials
- ★ Each Part Interlocks and Snaps Together! No Glueing!
- ★ 100% Accurate Anatomically

This human skeleton model is completely authentic—each bone is built in perfect scale to a 6' man. Easy to assemble...each part interlocks and snaps together. Unbreakable. Praised by medical schools, doctors, scientists. Large anatomical charts included **FREE**. Helps you locate and identify every bone in human body. No. 194 ..... **\$1.98**



## Cigaret Case and Lighter

Pull Trigger—It Hands You a Cigarette →

Pull Trigger Again—Gives You a Light →



The rage of Germany, England, France and Italy. Press trigger and out pops a cigarette—press trigger again and barrel lights your cigarette with real flame! It's the most unusual, most different lighter we've yet seen. Precision made by skilled German craftsmen. It never needs repairs or adjustments. Compact—fits pocket or purse. Great party stopper—conversation starter—house gift! Looks like a \$10.00 item—yet Thoresen's price is just **\$2.98**. No. 422.

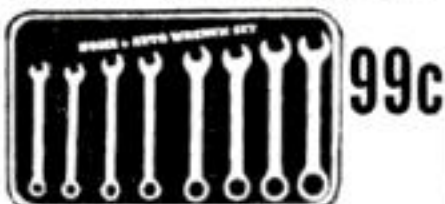
## Talk or Sing on Radio or TV with this Hi-Modality Microphone!

**1.98**



Be the life of the party...talk, sing, act thru any radio or T.V. with this new Hi-Modality Microphone. This you can do unseen from another room. Create dramatic effects by cutting in on programs with special news announcements. Educational for children too! Ideal for voice development, correction of speech defects. No. 187 ..... **\$1.98**

## 8-Pc. Wrench Set



8-piece set in handy plastic kit. Contains 8 drop forged chrome plated wrenches. No. 701. **99c**.

## Thoresen Holesaw

Saws any shaped hole for ¼" electric drills. Bore thru wood, plastics, aluminum, plaster, etc. No. 42 ..... **95c**

## DACRON Insulated Vest

Orig. \$9.95 **3.98**



Dacron Insulated Vest, extra-large zipper. Two huge roomy pockets within elastic shellings. It's washable. Dries fast. **SHRINK-PROOF!** Keeps shape. Dust-proof. Mothproof. This same insulated Vest sold for \$9.95—now only \$3.98 to our customers. Sizes: SMALL (36-38); MEDIUM (40-42); LARGE (44-46); EXTRA LARGE (48-50). No. 53 Insulated Vest \$3.98. For man who prefers the best, we recommend our TRIPLE GARD Model. Order by No. 53-D, \$4.98 complete.

## Car Owner's HANDBOOK

1001 tips, how-to info that may save you hundreds! Used by 250,000 car owners. Orig. \$2.00—now **11c** (one to customer). No. 999.



## Stop TV & Radio Noise

New electronic Filter stops hum & static caused by motors, planes, trains, electrical appliances. Enjoy TV & radio without interference. Thousands sold! No. 438 Noise Filter... **\$1**



## TV REMOTE CONTROL

Can be adapted for radio, electrical appliances—even to control outside lights from inside your house



Guests Will Think You're Using a

**RADAR BEAM!**

**CLICK...CLICK** turn TV Set on or off Any Distance up to 25 FEET!

**2.98**

Now—operate your TV or Radio Set from your easy chair or bed. Use your REMOTE CONTROL Switch. Click...click! Your set goes on or off like magic! Works automatically from any distance—up to 25 feet. No. 443 Remote Control **\$2.98**.

**THORESEN, Inc., Dept. 7-B**  
**585 Water Street, New York 2, N. Y.**

- Rush items on 10 day trial with money back guarantee.  
☐ Check or money order enclosed. (Minimum order \$1.)  
☐ Send C.O.D., plus postage and C.O.D. fee (enclose \$1 deposit).

NO.	QUANTITY	ARTICLE	PRICE

PRINT NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

Canadians: THORESEN, LTD., 439 King Street, Tor 2, B. Ont.



# Don't be half-trained

## CHOOSE YOUR CAREER IN



Train at home...  
in spare time...  
in one of America's  
Big 3 industries!!!

### TELEVISION RADIO-ELECTRONICS

SEND FOR YOUR  
**FREE**  
OPPORTUNITY BOOK  
AND ACTUAL LESSON  
**NOW!!!**



**YOU ARE NEEDED** in All Phases of TELEVISION-RADIO-ELECTRONICS...Servicing, Communications, Broadcasting, Manufacturing, Automation, Radar and Micro Waves, Missile and Rocket Projects, plus all the other high-pay branches of this vigorous industry. N.T.S. Shop Tested Home Training gives you ONE MASTER COURSE...at ONE LOW TUITION...to train you for these unlimited opportunities, including many technical jobs leading to supervisory positions.

**YOU BUILD MANY EXPERIMENTAL AND TEST UNITS WITH KITS AND PARTS WE SEND YOU**...you advance step by step, perform more than 100 experiments, and you build a complete, modern circuit TV set from the ground up! The set is yours to keep, including the big new TV picture tube we send you at no extra charge. You also build and keep a Short Wave-Long Wave Superhet Receiver. In addition, you receive a valuable Multitester for your repair, service, and trouble-shooting job projects.

**UP-TO-DATE, PRACTICAL LESSONS AND INSTRUCTION MATERIAL**...you'll find that every N.T.S. Shop Tested Home Training lesson and manual is easy to understand, with many numerous illustrations and diagrams. See for yourself. Check the Actual Lesson you receive FREE along with our Opportunity Book. Clip and mail coupon NOW!

### MAKE MORE MONEY...

A Successful Career... Security...  
Are Yours NOW in Modern Industry!

Every one of the "Big 3" industries...TV-RADIO-ELECTRONICS...AUTO MECHANICS AND DIESEL...AIR CONDITIONING-REFRIGERATION-ELECTRICAL APPLIANCES...each is growing at a tremendous pace.

Now is the best time for you to get into the industry of your choice! You can be a part of its growth...you can increase your earning power...really build a Successful, Secure Future, filled with all the good things life has to offer!!! Send for information NOW...TODAY. We'll give you all the facts by mail. There is no obligation on your part...you will be inconvenienced...as NO ONE WILL CALL ON YOU!!!

**YOUR N.T.S. TRAINING IS BETTER, MORE COMPLETE, LOWER COST!** Improved and tested in N.T.S. Resident School Shops and Laboratories, by the OLDEST and LARGEST School of its kind in the world. Established in 1905.

**COMPLETE**...you learn ALL Phases, and you receive EVERYTHING YOU NEED—Lessons, Manuals, Materials, many big Professional Kits with parts, tools, instruments for your experimental, repair, service, and trouble-shooting projects. You also receive many valuable training "Extras" to assure your success.

**LOWER COST**...other schools make several courses out of the material in each one of our MASTER COURSES...and charge you more for less training than you get in any one of our "Big 3" at ONE LOW TUITION.

**EARN AS YOU LEARN**...show you how you can earn money right from the start. Many students pay for their courses—and while studying. So can you!

**RESIDENT TRAINING AT LOS ANGELES**  
If you wish to take your training in our Resident School at Los Angeles, start NOW in our big, modern Shops and Labs. Here you work with latest equipment, professionally installed... finest most complete facilities offered by any school. Expert, friendly instructors. Personal attention. Graduate Advisory Service. Help in finding home near school...and part time job while you learn. Check box in coupon for full information.



**NATIONAL TECHNICAL SCHOOLS**  
WORLD-WIDE TRAINING SINCE 1905  
4000 S. FIGUEROA ST., LOS ANGELES 37, CALIF.



### NATIONAL TECHNICAL SCHOOLS

WORLD-WIDE TRAINING SINCE 1905

**MAIL NOW TO**  
National Technical Schools, Dept. C-20  
4000 S. Figueroa St., Los Angeles 37, Calif.  
Please rush FREE Book and Actual Lesson checked below. No obligation. No salesman will call.  
(CHECK ONE ONLY)

- ☐ "My Future in TV-Radio-Electronics" Book
- ☐ "My Future in Auto-Mechanics & Diesel" Book
- ☐ "My Future in Air Conditioning, Refrigeration & Electrical Appliance" Book

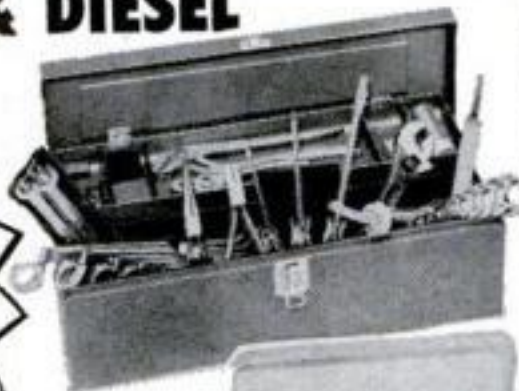
Name \_\_\_\_\_ Age \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_  
☐ Check here if interested ONLY in Resident Training at Los Angeles.

**VETERANS:** Give date of discharge \_\_\_\_\_

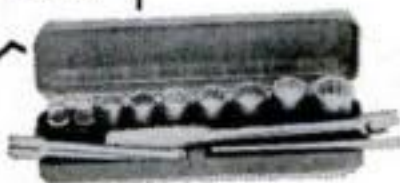


# be a MASTER TECHNICIAN ONE OF THESE 3 BIG PAY INDUSTRIES

## AUTO-MECHANICS & DIESEL



SEND FOR YOUR  
**FREE**  
OPPORTUNITY BOOK  
AND ACTUAL LESSON  
**NOW!!!**

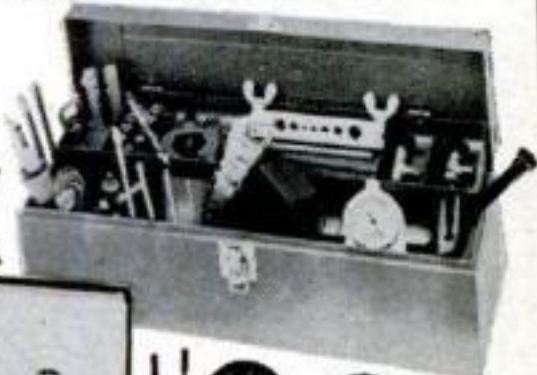


**TAKE YOUR CHOICE...** be a successful all-around car, truck and heavy-engine Mechanic. Or specialize in your favorite field...Tune-Up, Automatic Transmissions, Farm Mechanics, Trucks and Buses Stationary Installations, Foreign Cars, or get into Auto Air Conditioning, Engine Rebuilding, Diesel, and all the other high-pay fields too numerous to mention here. Or go into business for yourself. Remember...a qualified ALL AROUND MECHANIC always has a good job!

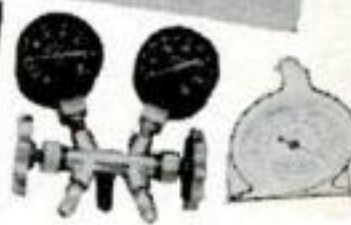
**EVERY PHASE SHOP TESTED...** our streamlined lessons, manuals and other training materials are easy to understand, completely practical and right up-to-date. **YOU ALSO GET AND KEEP VALUABLE PROFESSIONAL EQUIPMENT.** We send you a complete set of Mechanic's tools...an All-Metal Tool Box...a Motor Analyzing Set containing three valuable instruments in a sturdy carrying case...plus a Top Quality Socket Wrench Set with Fittings.

**PROVE IT TO YOURSELF...** N.T.S. gives you everything you need to make more money in today's big, opportunity filled Auto Mechanics and Diesel Industry. Send coupon!

## AIR CONDITIONING REFRIGERATION & ELECTRICAL APPLIANCES



SEND FOR YOUR  
**FREE**  
OPPORTUNITY BOOK  
AND ACTUAL LESSON  
**NOW!!!**



**FUTURE BRIGHT FOR TRAINED MASTER TECHNICIANS**...over 30,000 new Technicians must be trained annually. You are needed to help service and repair the 50 million air conditioners, refrigerators and electrical appliances that will need fixing this year alone. No wonder the Master Technician has steady work, at high pay, year after year. You can go places in your own business or with a manufacturer, dealer, distributor or department store. With All-Phase training, your earning power is unlimited!

**JOB TRAINING AT HOME...** you get Professional Technician's Tools, Precision Instruments, PLUS a factory-made APPLIANCE TESTER...a full set of PRACTICAL, professional equipment! You use them to conduct over 100 experiments...in your Spare Time Work while in training...and in your service, repair, and trouble-shooting work later on. It is all yours to keep!

**DON'T LOSE OUT—FIND OUT...** we'll rush you our big, illustrated OPPORTUNITY BOOK AND ACTUAL LESSON. No obligation. It costs nothing to find out. Mail coupon...DO IT NOW!

**SEND ONE OF THE 3 COUPONS TODAY! ASK ONE OR TWO FRIENDS TO DO THE SAME. IT'S FUN TO STUDY TOGETHER.**

### NATIONAL TECHNICAL SCHOOLS

WORLD-WIDE TRAINING SINCE 1905

MAIL NOW TO

National Technical Schools, Dept. C-20  
4000 S. Figueroa St., Los Angeles 37, Calif.

Please rush FREE Book and Actual Lesson checked below. No obligation. No salesman will call.

(CHECK ONE ONLY)

- ☐ "My Future in Auto-Mechanics & Diesel" Book
- ☐ "My Future in TV-Radio-Electronics" Book
- ☐ "My Future in Air Conditioning, Refrigeration & Electrical Appliance" Book

Name \_\_\_\_\_ Age \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

☐ Check here if interested ONLY in Resident Training at Los Angeles.  
VETERANS: Give date of discharge \_\_\_\_\_

### NATIONAL TECHNICAL SCHOOLS

WORLD-WIDE TRAINING SINCE 1905

MAIL NOW TO

National Technical Schools, Dept. C-20  
4000 S. Figueroa St., Los Angeles 37, Calif.

Please rush FREE Book and Actual Lesson checked below. No obligation. No salesman will call.

(CHECK ONE ONLY)

- ☐ "My Future in Air Conditioning, Refrigeration & Electrical Appliance" Book
- ☐ "My Future in TV-Radio-Electronics" Book
- ☐ "My Future in Auto-Mechanics & Diesel" Book

Name \_\_\_\_\_ Age \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

☐ Check here if interested ONLY in Resident Training at Los Angeles.  
VETERANS: Give date of discharge \_\_\_\_\_



# ...have you heard...?

the strength of his steering-wheel grip, his heart rate, the number of head movements he makes, etc. The controls would

be triggered at preset limits to warn the driver if he were getting out of control. If necessary they could even take over.



**On the price front.** What costs will go up, what down in 1960? Here's how experts see it:

- **Lumber—down.** Partly because of overproduction, partly because fewer homes will be built. (Lumber companies blame the latter on tight money and the steel strike.)

- **Plumbing supplies—up.** There'll be a five-percent across-the-board increase in prices for bathtubs, sinks, and other standard fixtures.

- **Electrical appliances—up.** A deluge of price-cutting followed the demise of company-fixed "fair trade" prices. But since then, prices have started spiraling again, and will continue. Two strong factors affect appliance prices in opposite ways: The price and availability of steel nudges prices up; fear of foreign competition urges them down.

- **Food—in general, down.** Meats continue in good supply—pork at bargain prices through 1960, beef following suit in '61.

- **Shoes—down.** There's been a drop in hide prices.

- **Men's suits—up.** Heavy textile buying pushed prices up. Designers will try to make last year's suit "obsolete" to move new ones off the racks.

**Foiled by a woman!** Lone bank robbers should never underestimate the power of a woman teller:

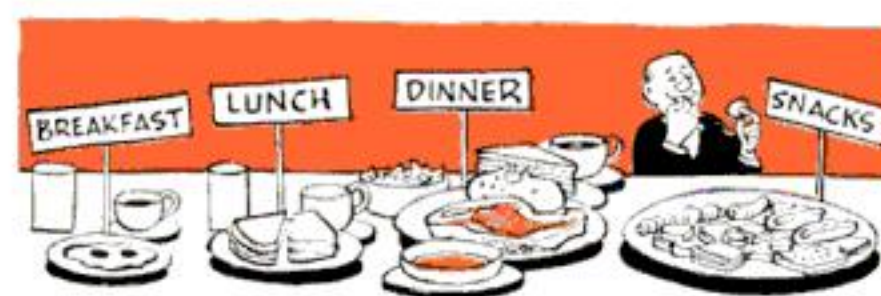
Last year 74 lone-wolf bandits were frustrated in holdups, more than half—

39 of them—by quick-thinking ladies.

All told, robbers pulled off 268 bank holdups in the year ending August 31, according to the American Bankers Association. They stole \$1.4 million.

**Three square meals a day?** They may be the ruin of you, according to biochemist Dr. Clarence Cohn of Chicago. The strain of peak demand on your inner organs may touch off heart and circulatory ailments.

Children seem to know instinctively when and what to eat, says Dr. Cohn. There's no reason, except ingrained habit, for man not to live by "demand feeding,"



too. In fact, he suggests the day may come when the conventional lunch hour will be replaced by short "food breaks."

**That mysterious arrow poison,** curare, long used by South American Indians (and by mystery-story writers in search of the perfect weapon), has been synthesized in the lab.

The drug, derived from a calabash

plant, has important muscle-relaxing qualities. Prof. Paul Karrer of the University of Zurich reports that several Swiss hospitals are testing the man-made version in operations, to relax the patient and reduce need for anesthetics.





**ILLINOIS**  
 "Have averaged  
 over \$50,000  
 my first 3 years.  
 Hqtrs' help make it possible"  
 M. Lyons, Chicago.



**VIRGINIA**  
 "My 10th year  
 and business  
 keeps growing.  
 Have made as  
 much as \$485  
 in one day"  
 E. Roddey,  
 Hampton.



**CALIFORNIA**  
 "Made as much  
 as \$347 on just  
 one job. You  
 can't miss with  
 Duraclean" ...  
 C. W. Morris,  
 Sacramento.



**SOUTH DAKOTA**  
 "Earned \$1571 in a  
 single month.  
 Homeowners here  
 have great need  
 for our services" ...  
 L. Canaday,  
 Rapid City

**ARKANSAS**  
 "Every person thinks  
 of owning a  
 business. I know of  
 no other which can  
 offer a man  
 so much" ...  
 E. Bailey, Hot Springs.

## These Men are Building Lifetime Businesses!



**MINNESOTA** "Averaging  
 over \$300 per month  
 part-time. Nothing beats  
 being your own boss" ...  
 T. Mason, Winona.



**NEW YORK**  
 "National advertising  
 is tops. One lead  
 from Hqtrs' got me 3 jobs  
 totaling \$500" ...  
 T. Cook, Freeport.



### 6 WAYS TO MAKE MONEY

You get exclusive use of unique absorption process which cleans carpets and upholstery without harmful scrubbing, soaking or shrinkage. It's acclaimed by housewives, mfrs and backed by McCalls and Parents' Seals. Five other profitable services are soil retarding, mothproofing, flame proofing, spotting and carpet repairing. Thus, on most jobs you multiply profits. "Headquarters say gross \$9.00 per hour. I gross up to \$12.00. Many dealers I know do even better," says Dan Chilcott of N. Platte, Neb.

## You, too, can make BIG MONEY IN THIS Booming Industry

**IN YOUR TOWN**, there's a real opportunity right now for you to meet the growing demand for cleaning of costly carpets and upholstery . . . services for which homeowners are ready to pay good money. Mechanical methods have proved to be harmful to fabrics, so the field is wide open with our exclusive, safe, scientific absorption method of cleaning. Have you investigated this opportunity? Thousands like those above have, and are now enjoying the financial security of their own business. Many have started part-time and so can you!

This business is easy to learn, and quickly established. There's no shop needed . . . you operate from home and provide all services in your customer's homes.



We'll train you, show you the proved methods for operating and building your own business, and then back you with 25 continuous services.

By starting now, you will be getting in on the **GROUND FLOOR** of a \$750 million a year industry!

### WE HELP YOU GROW

Under our unique cooperative program, you are fully trained through a nearby dealer and at our 50-hour

training school. You're kept up-to-date through monthly magazines, nat'l conventions, and at regional meetings where Hqtrs' staff come to you in your area. You're backed by nat'l advertising in consumer (McCalls, Parents', House & Garden, etc.) and trade magazines. Others of 25 services which help assure your success include: Individual counseling (staff of specialists give you prompt, expert counsel), ad kits, folders, product development, plus others.

**EASY TERMS** Moderate payment establishes your own business—pay balance from sales. We furnish machines, sales material and enough supplies to return your **TOTAL** investment.

ONLY PROCESS TO WIN THESE HONORS



PROOF OF SUPERIORITY

#### What Manufacturers Say

"... (Duraclean) standards in keeping with service to which . . . carpets and consumer are entitled." —Avisco (American Viscose Corp)

"... superior to any on-location process with which I'm familiar." —President, Modern Tufting Co.

"... we approve this process . . . in keeping with better service to Mrs. Housewife." —Aldon Rug Mills

### Send for FREE booklets



Free 16-page booklets detail dealership program. No obligations, no salesman will call. Clip and mail coupon today.

### "OWN A BUSINESS" COUPON

**DURACLEAN CO., 0-182 Duraclean Bldg., Deerfield, Ill.**

Please rush FREE 16-page booklets which detail how I may own my own business. I understand I am under no obligations and no salesman will call.

Name..... (please print)

Address..... County.....

City..... State.....

**DURACLEAN CO., 0-182 Duraclean Bldg., Deerfield, Ill.**



GET READY FOR THE SPACE and SCIENCE ERA! SEE SATELLITES, MOON ROCKETS CLOSE-UP



# AMAZING OPTICAL BUYS

and OTHER SCIENTIFIC BARGAINS



See the Stars, Moon, Planets Close Up!

## 3" ASTRONOMICAL REFLECTING TELESCOPE

60 to 180 Power—Famous Mt. Palomar Type! An Unusual Buy!



Assembled—Ready to use! You'll see the Rings of Saturn, the fascinating planet Mars, huge craters on the Moon, Star Clusters, Moons of Jupiter in detail. Galaxies! Equatorial mount with lock on both axes. Aluminized and over-coated 3" diameter high-speed f/10 mirror. Telescope comes equipped with a 60X eyepiece and a mounted Barlow Lens, giving you 60 to 180 power. Low-cost accessory eyepiece available for higher powers. An Optical Finder Telescope, always so essential, is also included. Sturdy, hardwood, portable tripod. FREE with Scope:

—Valuable STAR CHART plus 272 page "HANDBOOK OF HEAVENS" plus "HOW TO USE YOUR TELESCOPE" BOOK.

Stock No. 85,050-N .....\$29.95 postpaid

**KNOW THE TRUTH ABOUT POWER.** Telescope experts will confirm that an Astronomical Telescope will only give you practical powers to about 50 or 60 times per inch of objective diameter—powers above this only produce empty magnification—make viewing dim, difficult and unsatisfactory.

## 4 1/4" ASTRONOMICAL TELESCOPE

UP TO 255 POWER!



With this scope you can see everything as above but with greater power plus will split finer stars. Mirror has twice the light gathering power. Mirror guaranteed to give theoretical limit of resolution. Rack and pinion focusing, hardwood tripod, real equatorial mounting—only one adjustment follows stars! Aluminum tube. 6 power finder telescope. 2 standard size eyepieces and mounted Barlow lens give you powers of 40X, 90X, 120X, and 255X. Low-cost accessory eyepiece available for higher powers. FREE with Scope:—Valuable STAR CHART plus 272 page "HANDBOOK OF HEAVENS" plus "HOW TO USE YOUR TELESCOPE" BOOK. Shipping weight 25 lbs. Stock No. 85,006-N.....\$74.50 f.o.b.

Same Telescope as above but equipped with Electric Clock Drive—Stock No. 85,094-N.....\$111.50 f.o.b. Barrington, N. J.

## STEREO MICROSCOPE—TERRIFIC BUY!

23 and 40 Power!



Other American made stereos cost \$250.00 to \$600.00 and more! Now—save well over 50%. Up to 3" working distance. Erect image—wide 3-dimensional field. Helical rack and pinion focusing. So good we offer 10-DAY TRIAL... complete satisfaction or your money back. Order—Stock No. 85,056-N. Full price.....\$99.50 F.O.B. Barrington, N. J.

## NEW BINOCULAR-TO-CAMERA HOLDER

For Exciting Telephoto Pictures



Will fit any camera. Bring distant objects 7 times nearer with a 35 mm. camera. 7x50 binocular and our NEW BINOCULAR-TO-CAMERA HOLDER. Ideal for long-range shots of wild life, planes, ships, people, etc. Camera and binoculars attach easily. Use any binocular or monocular—any camera, still or movie. Take color or black and white. Full directions for taking telephotos. Stock No. 70,223-N.....\$11.50 Postpaid

## BUILD A SOLAR ENERGY FURNACE



A fascinating new field. Build your own Solar Furnace for experimentation—many practical uses. Easy! Inexpensive! Use scrapwood! We furnish instructions. This sun powered furnace will generate terrific heat—2000° to 3000°. Fuses enamel to metal. Sets paper aflame in seconds. Use our Fresnel Lens—14 3/4" diameter... f.1. 14". Stock No. 70,130-N... Fresnel Lens... \$6.00 Postpaid

## WAR SURPLUS! — INFRARED SNOOPERSCOPE

Govt. Cost \$900—Bargain at \$39.50

Converts infrared to visible light. See in total darkness without being seen. Use in lab, factory, classroom, etc. Completely portable. Operates on two flashlight batteries (not included). Image is quite good, may be made even better by careful focusing. Size 11 1/2" x 8". Weight with carrying case 12 lbs. No infrared light source is furnished. (See below).

Stock No. 85,098-N.....\$39.50 f.o.b. Barrington, N.J.

## INFRARED LIGHT SOURCE AVAILABILITY!

You will need a 6 volt transformer or 6V auto battery to operate. Stock No. 80,035-N.....\$10.00 Pstpd.



## SPECIAL! SPECIAL! Terrific Buy! American Made! OPAQUE PROJECTOR



Projects illustrations up to 3" x 3 1/2" and enlarges them to 4 ft. wide. No film or negatives needed. Projects charts, diagrams, pictures, photos, lettering in full color or black-and-white. Operates on 115 volt, A.C. current. 6-ft. extension cord and plug included. Operates on 60 watt bulb, not included. Size 12" x 8" x 4 1/2" wide. Weight 1 lb., 2 oz. Plastic case with built-in handle.

Stock No. 70,199-N.....\$7.95 postpaid

NOTICE: EDMUND IS NOW HEADQUARTERS FOR MATH LEARNING AND TEACHING AIDS! SEE DOZENS OF OFFERINGS IN OUR FREE CATALOG—"N".

## NEW! CIRCULAR SLIDE RULE!

Pocket Size—Fast—Easy to Use!

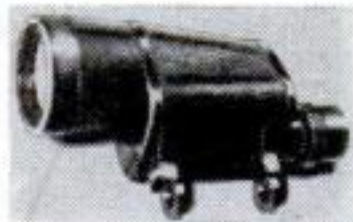
Be a Math Whiz! New Circular Slide Rule multiplies, divides, figures fractions, percentages, squares, cubes, roots, proportions, circumferences, areas, retail prices, fuel consumption. Eliminates the confusions of ordinary slide-rules. Priced far lower. Faster, easier to learn and use. Constructed of 2 aluminum discs with plastic indicator. 3 1/2" diameter. Directions included. Stock No. 30,336-N .....\$4.95 postpaid



## Take Telephoto Shots Thru 7x50 MONOCULAR

This is fine quality, American made instrument—war surplus! Actually 1 1/2 of U. S. Govt. 7 x 50 Binocular. Used for general observation both day and night and to take fascinating telephoto shots with your camera. Brand new, \$95 value. Due to Japanese competition we close these out at a bargain price. Directions and mounting hints included.

Stock No. 50,003-N.....\$15.00 Postpaid



## 'FISH' WITH A MAGNET

Go Treasure Hunting On The Bottom

Great idea! Fascinating fun and sometimes tremendously profitable! Tie a line to our 5-lb. Magnet—drop it overboard in bay, river, lake or ocean. Troll it along the bottom—your "treasure" haul can be outboard motors, anchors, fishing tackle, all kinds of metal valuables. 5-lb. Magnet is war surplus—Alnico V Type—a terrific bargain. Lifts over 125 lbs. on land—much greater weights under water. Order now and try this new sport. Stock No. 70,183-N. 5-lb. Magnet.....\$8.50 Postpaid 15 3/4 lb. size. Will lift over 250 lbs.

Stock No. 85,088-N 15 3/4 lb. size.....\$22.50 F.O.B. Barrington, N. J. Shipping weight 22 lbs.



## HAND SIGHTING LEVEL

Described in Popular Mechanics Merch 1959 issue, page 212

Sight it like a Telescope. Gives you a level line of sight, for laying out gardens, drives, new construction, ditches, etc. Complete instructions included.

Stock No. 105-N.....\$2.50 postpaid



## Check, Measure, Inspect with this 6 POWER POCKET COMPARATOR

(Complete with Leather Case)

MEASURES • Angles • Radii • Circles • Linear—in both decimal inches and millimeters.

Used to check layouts, machining on tools, dies, gauges; to check threads, chamfers, wear on cutting tools, etc.

Stock No. 30,061-N.....New Low Price.....\$19.50 Pstpd.



## FREE CATALOG-N

128 Pages! over 1000 Bargains!

America's No. 1 source of supply for experimenters, hobbyists. Complete line of Astronomical Telescope parts and assembled Telescope. Also huge selection of lenses, prisms, war surplus optical instruments, parts and accessories. Telescopes, microscopes, satellite scopes, binoculars, infrared sniperscopes, science experiment items, math learning and teaching aids.

REQUEST CATALOG-N



ORDER BY STOCK NUMBER . . . SEND CHECK OR MONEY ORDER . . . SATISFACTION GUARANTEED!

**EDMUND SCIENTIFIC CO. BARRINGTON, NEW JERSEY**

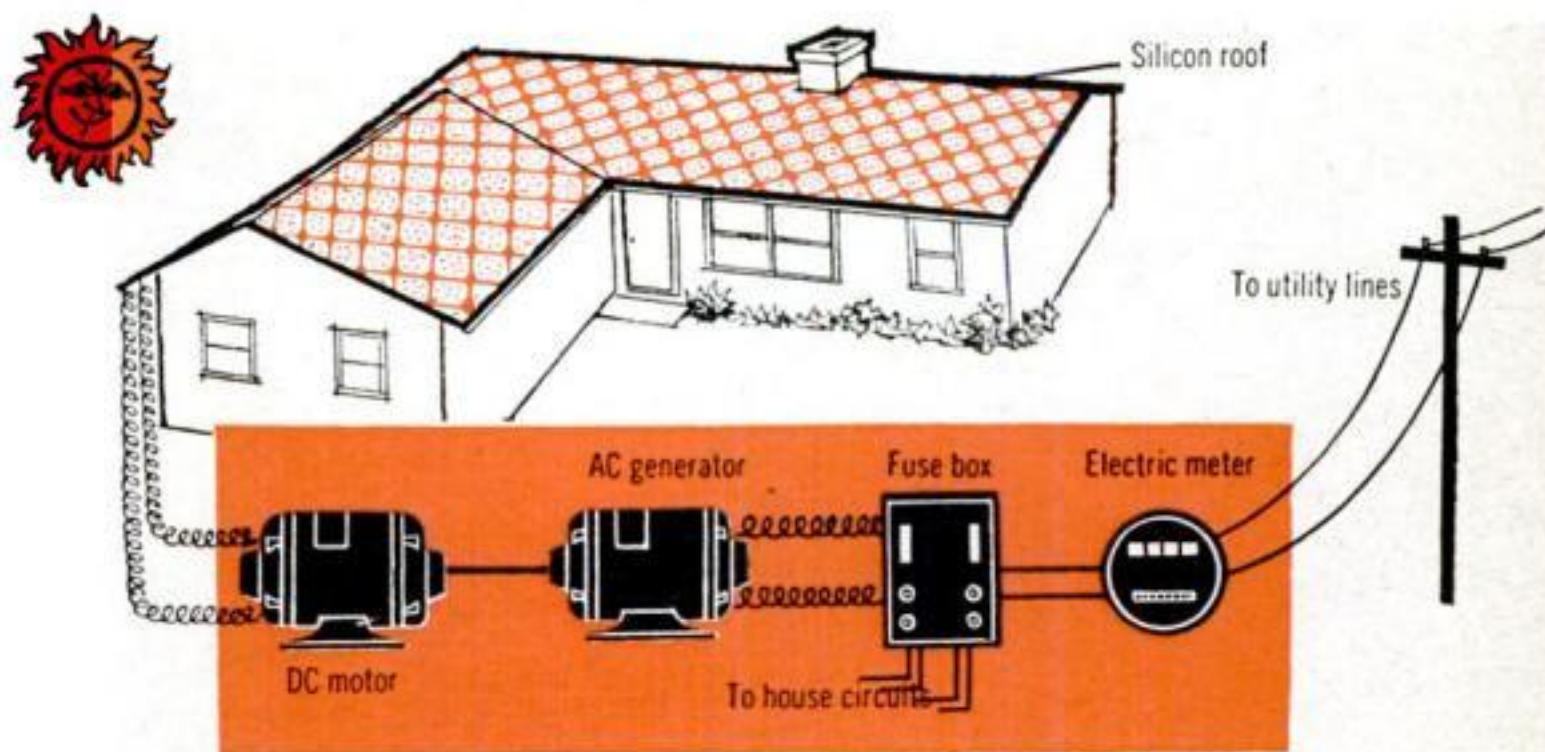


# The month in science

**Every home a power plant.** The tantalizing fact is that the sun pours 100 to 200 kilowatts of absolutely free energy onto the roof of your house, and all this does is melt snow and heat up the attic. Such waste has long upset penny-conscious engineers, even more so now that pretty good sunlight-to-electricity converters are available. Recently L. F. Giacoletto, a Ford scientist, took a hard look at the practical problem of making sun-on-the-roof run the family lights, toaster, and TV set. But don't break off relations with the power company yet; home sun power is still not worthwhile by a long shot (see p. 69 for another power idea).

One problem is storage. You need most electricity when the sun is not shining. Giacoletto's solution is the scheme tried with windmill generators: Feed homemade electricity that you don't need into the power company's lines. Distribution networks are already interconnected to cover very large areas of the country, so cloudy sections could use the surplus from sunlit sections. Your electric meter would run backward when you fed power into the system, forward when you took power out—you'd automatically get billed only for other people's juice you used.

Nights, of course, the whole U. S. is dark. The power companies' big stations would have to pitch in. Even then, though, homemade electricity could help. During the day it could drive big pumps to lift water into storage reservoirs; at night the water would run out to drive turbines, saving on steam costs.



To put this idea into practice, your house would have to be roofed with silicon solar cells (the kind used to power satellite instruments). They would feed a DC motor in your cellar. The motor would spin an AC dynamo connected both to your house mains and to the utility lines.

Giacoletto fed numbers into his slide rule and came up with intriguing cost figures. An average house roof in Detroit would produce about 10,000 kilowatt-hours of usable AC per year (allowing for cloudy days and losses in solar cells, motor, and dynamo). That's three times as much as the average house con-



# The month in science

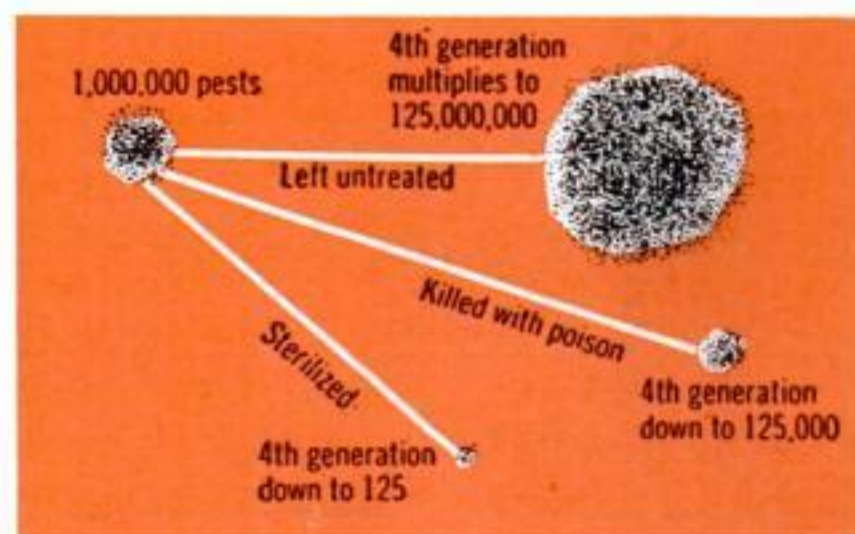
sumes per year. A motor-generator set for your cellar would cost less than \$1,000, which is reasonable considering that it should last much longer than your furnace.

The joker is that roof. At present prices, the cost of roofing your house with ultra-pure silicon is "in the neighborhood of \$250,000." A ritzy neighborhood. Don't give up hope, though. Remember what happened to another once-costly element, aluminum. Not too long ago it was so expensive it was used only for jewelry. Now the commercial metal—very, very pure—is indeed cheap enough to be a common roofing material.

**Sex—the best pest-killer.** Couple of years ago agricultural scientists rid the island of Curacao of screwworms—a costly nuisance to livestock—by a roundabout, highly unorthodox scheme. They released barrelsful of male screwworms that had been sexually sterilized (from exposure to atomic rays) but not otherwise harmed. Lady screwworms happily but fruitlessly mated with the sterile males, and soon screwworms were as extinct as saber-toothed tigers.

This dirty trick worked so well (a current trial in Florida is also paying off) that E. F. Knipling of the U. S. Department of Agriculture thinks it should be applied to other pests—not just bugs but mice, rats, and bigger animals. He figures that forcing racial suicide gets rid of the unwanted more quickly than simply killing them off.

Knipling cites a theoretical example of a million pests (see chart at left). Left alone, they'd multiply to 125 million by the fourth generation. Killed off by poison (90 percent effective) in the usual manner, the fourth generation would be down to 125,000. But if 90 percent of each generation were sterilized, the fourth generation would number just 125, period. The Curacao experiment checked out these calculations (the fourth generation of screwworms there was zero).



For sterilization to work this well, the pests have to cooperate. The females must be monogamous and the males sexually vigorous after sterilization (screwworms were very helpful; the females mate just once, while the males are completely promiscuous). You also have to kill off most of the pests first, then breed and release enough sterile males so that they outnumber the unsterilized ones nine to one. Better and easier would be a chemical that sterilized 90 percent of all the pests "in the field." Such a chemical hasn't been developed yet, but should be possible.

Success of the sterile-male method for total extinction also has its frightening aspects. Could what happened to screwworms in Curacao happen to people after a really hot atomic war?





## DOES A HILLHOLDER HOLD HILLS?

No, but with it you can hold The Lark on a steep hill without ever touching the brake pedal. It's a simple optional device of convenience, but one that you won't find on other cars. ➤ With Lark synchromesh transmission, braking action on hills is maintained simply by flooring the clutch pedal. Prevents rollback and is particularly pleasant on icy slippery hills. ➤ Why do we make such a "thing" over a mere hillholder? Simply to point out that Studebaker engineers and design people are a very thorough lot. ➤ You'll find a very high degree of skillful detailing and ingenious design in The Lark plus a variety of features other new dimension cars don't even have available: headrests, reclining seats, limited slip differential, choice of axle ratios, 4-barrel carburetor for the V-8 (0-60 in 9.5 seconds) ... even air conditioning. ➤ The Lark is a car of delightful surprises ... particularly when you drive it. Tell your Studebaker Dealer to demonstrate on a twisty road. You'll "get the message" and you'll —

*LOVE THAT* **LARK** *BY STUDEBAKER*



# Check the Kind of Body YOU Want:



- ☐ Slimmer Waist, Hips
- ☐ Broader Chest, Shoulders
- ☐ More Weight, Solid
- ☐ More Powerful Arms
- ☐ More Powerful Legs
- ☐ More Energy, More Restful Sleep

... and I'll Show You How EASILY  
You Can HAVE it!

JUST tell me, in coupon below, the kind of body you want—and I'll give it to you SO FAST your friends will be amazed! I'll show you how you can become a NEW MAN in just 15 minutes a day—in your own home—or it won't cost you a penny!

You wouldn't believe it, but I myself used to be a 97-lb. weakling. Fellows called me "Skinny." Girls made fun of me. THEN I discovered my marvelous new muscle-building system—"Dynamic Tension." It turned me into such a specimen of MANHOOD that today I hold the title "THE WORLD'S MOST PERFECTLY DEVELOPED MAN."

"DYNAMIC TENSION"—that's my secret! When you look in the mirror and see a healthy, husky fellow smiling back at you—then you'll realize how fast "Dynamic Tension" GETS RESULTS. That's because it's the natural method you can practice in your own room—JUST 15 MINUTES A DAY—while your chest and shoulder muscles begin to swell... those arms and legs of yours bulge... and your whole body starts to feel "alive"—full of zip and go—INSIDE and OUT!



**FREE** Illustrated 32-Page Book  
Not \$1.00 - Not 10¢ - But FREE!

Send NOW for my famous book showing how "Dynamic Tension" can make you a new man. 32 pages, packed with photos, valuable advice, answers to vital questions. I'll send you a copy absolutely FREE if you rush coupon to me personally.

Charles Atlas, Dept. 12,  
115 E. 23rd St., New York 10, N.Y.



CHARLES ATLAS, Dept. 12,  
115 East 23rd St., New York 10, N. Y.

Dear Charles Atlas—Here's the Kind of Body I Want:

(Check as many as you like)

- |   |   |
|---|---|
| <input type="checkbox"/> Slimmer Waist, Hips      | <input type="checkbox"/> More Powerful Arms |
| <input type="checkbox"/> Broader Chest, Shoulders | <input type="checkbox"/> More Powerful Legs |
| <input type="checkbox"/> More Weight, Solid       | <input type="checkbox"/> Better Energy      |

Send me, absolutely FREE, a copy of your famous book showing how "Dynamic Tension" can make me a new man. 32 pages, crammed with photographs, answers to vital questions, and valuable advice. No obligation.

Name..... Age.....  
(Please print or write plainly)

Address.....

City..... Zone..... State.....



## HOW TO WIN SUCCESS WITH YOUR VOICE

Special NEW experts' course!

PUT NEW STRENGTH AND MAGNETISM into your voice through this completely new, thoroughly-proven method. Win success as thousands of others have done—through our special course originally created for announcers, actors and other professionals—NOW AVAILABLE TO PUBLIC FOR FIRST TIME. Self-training in the privacy of your room. Requires only minutes a day—no other course like it! Includes 2 large LP Hi-Fi training records by top TV-radio network announcers, amazing TR-18 transistor microphone for self-testing, 10 illustrated, easy-to-follow lessons. Exclusive tape-recorded "final exam" assures maximum results. Money-back guarantee.

**FREE BOOKLET**—Write today for our fascinating free booklet and open a whole new world of business, financial and social success. No cost, no obligation. Just send name, address, age. Booklet will be sent immediately in sealed envelope. No salesman will call.

**HOLLYWOOD VOICE-SPEECH INSTITUTE**

Studio A-20, 5504 Hollywood Boulevard, Hollywood 28, California

**FREE!**  
100  
WORLD-WIDE  
STAMPS  
...just  
released!



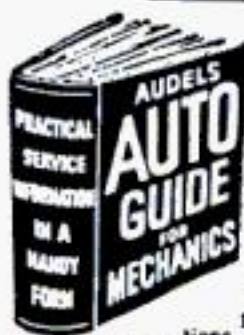
**HURRY! SEND TODAY** for colorful, valuable collection of 100 World-Wide stamps. Get new issues of past 12 months. From far corners of the world... Ghana, Togo, China, Polynesia, India, Australia, Honduras, Iceland and many others. Wonderful new additions to your collection. All different, all genuine, topicals, pictorials, bi-colors, mint and used. Limited supply. Only one to a collector. Plus free complete, helpful "Stamp Collector's Guide" and other offers for your FREE inspection. Send name, address, enclose 10¢ for handling and postage. Garcelon Stamp Company, Dept. 2PSX Calais, Maine

**GARCELON STAMP CO., Dept. 2PSX**

Calais, Maine — Rush FREE 100 Different Stamps, Collector's Guide, other offers. Enclosed 10¢ for handling. (PLEASE PRINT).



## WHAT ALL AUTO MECHANICS WANT TO KNOW



This Big Practical Book gives full information, with working diagrams, covering the principles, construction, ignition, service and repair of modern cars, trucks and buses.

Diesel Engines, Hydramatic and Fluid Drives Fully Explained.

A complete guide of 1696 Pages, with over 1500 Illustrations showing inside views of working parts, with instructions for service jobs. Completely up-to-the-minute! Priced at only \$6.

CIRCLE No. 1 IN COUPON



## HOW TO FIX HOME APPLIANCES

REFRIGERATORS WASHERS TOASTERS DRYERS IRONERS RANGES VACUUMS FREEZERS

Many other GAS AND ELECTRIC APPLIANCES



Handy Reference for Electric & Gas Servicemen, Mechanics, Dealers and Homeowners. Explains clearly and simply how to locate troubles, how to test, reassemble and connect. Wiring diagrams. 1000 Facts. Easy to read. Answers ALL your questions. 864 Pages. Illustrated. Only \$6.

CIRCLE No. 2 IN COUPON



## TV TELLS HOW TO ANSWER RADIO T.V. QUESTIONS SERVICE LIBRARY

HERE IS LATE INFORMATION IN A HANDY FORM FOR RADIO AND TELEVISION REPAIRMEN, SERVICEMEN AND STUDENTS

TWO COMPLETE VOLUMES - 1568 Pages - 1085 Illustrations and Diagrams. 1001 Important Facts and Figures on Modern T.V., Radio, Electronic Devices. INCLUDES TRANSISTORS & Transistors Circuits, Rectifiers, Record Changers, P.A. Systems, Phonograph Pick-ups, F.M., Auto Radio, Short Wave,

Basic principles, Construction, Installation, Operation,



tion, Repairs, Trouble Shooting. How to get Sharp, Clear T.V. Pictures. Install Aerials. How to Test. Explains COLOR SYSTEMS, Methods of Conversion, Terms, etc. Includes Ultra High Frequency. Quick ready reference or use as a home study course. Only \$8 for BOTH volumes.

CIRCLE No. 3 IN COUPON

## KNOW YOUR TRUCK

The TRUCK & TRACTOR GUIDE for Mechanics & Drivers, Foremen, Garagemen, Helpers, Owners, Trouble Shooters, Farmers, etc. Covering Gas & Diesel Motor Principles - Construction - Operation - Maintenance - Repair - Brakes - Service of all Parts. 1376 Pages. FULLY ILLUSTRATED. Index. Only \$5.

CIRCLE No. 5 IN COUPON



## PLUMBERS AND STEAMFITTERS GUIDES



Practical Trade Assistant & Reference Set. Explains in plain language and by clear illustrations, diagrams, charts, graphs and pictures the principles of modern plumbing practice including Pipe Fitting and Air Conditioning. 4 Vols. - 2624 Pages - 3642 Diagrams & Illustrations. Only \$8 for the complete set of 4 vols.

CIRCLE No. 6 IN COUPON

## PAINTING & DECORATING MANUAL

Inside Trade information on outside and inside work, how to mix paints, preparation of surfaces, paper hanging, wood finishes, tools, synthetic paints, color (with color chart), spray equipment, costs, estimating, etc. A COMPLETE guide to easier, better painting and decorating. 464 Pages. Fully Illustrated. Only \$2.

CIRCLE No. 7 IN COUPON

## 7-DAY FREE EXAMINATION

SEND NO MONEY - Pay the postman nothing! We are glad to send you any of the Audel Guides for absolutely FREE examination in your own home. We take all the risks and leave all the decisions up to YOU. There is no obligation! If you decide to keep the books of your choice you may pay for them under our astounding easy-pay plan of only \$2 a month.

### HERE IS ALL YOU DO

IT'S EASY TO ORDER: In the No-Risk Mail Order Coupon at the right just draw a circle around the number of Audel Guides you want us to send you for FREE EXAMINATION. We will send them to you at once to help you build a brighter future by increasing your SKILL. If for any reason at all you are not COMPLETELY satisfied, return the books to us, and that will end the matter! NO STRINGS OR CATCHES TO THIS OFFER.

**THEO. AUDEL & CO.**  
49 West 23rd Street, New York 10, N.Y.

## CARPENTERS AND BUILDERS GUIDES



PRACTICAL STOREHOUSE OF MODERN CONSTRUCTION INFORMATION (4 vol. set) for carpenters and all woodworkers. Explains in easy language and by profuse illustration principles, advances, short cuts, trade secrets, all based on the NEWEST information. Vol. 1 - Tools, steel square, saw filing, joinery, furniture, etc.; Vol. 2 - Builders' mathematics, drawing plans, specifications, estimates, etc.; Vol. 3 - House and roof framing, laying out, foundations, etc.; Vol. 4 - Doors, windows, stair building, millwork, painting, etc. 4 vols. 1904 Pages. 3700 Illustrations. Whole set only \$8.

CIRCLE No. 8 IN COUPON

## PRACTICAL ELECTRICITY

A COMPLETE HANDBOOK - Quick, simplified, ready reference. Complete instruction and practical information on the rules and laws of electricity - Maintenance of Machinery - A.C. and D.C. Motors - Armatures - Wiring Diagrams - House Lighting - Power Wiring - Meters - Batteries - Transformers - etc. Simple to understand. 1520 Pages. 2600 Illustrations. Priced at \$5.

CIRCLE No. 4 IN COUPON

## DIESEL

ALL THERE IS TO KNOW ABOUT MODERN DIESEL ENGINES - Basic principles, starting valves, timing, fuel pumps, fuel injection compressor, air compressors, pistons, cylinders, lubrication, cooling systems, etc. Answers on operation, calculations. 640 Pages. Fully Illustrated. Priced \$3.

CIRCLE No. 9 IN COUPON

## WELDERS GUIDE

Covers Electric, Oxy-acetylene, Thermit, Unionmelt welding for sheet metal, spot and pipe welds, pressure vessels and aluminum, copper, brass, bronze and other metals. Airplane work, surface hardening, hard facing, cutting, brazing, etc. 608 Pages. Fully Illustrated. Only \$3.

CIRCLE No. 10 IN COUPON

## MATHEMATICS MADE EASY

A COMPLETE HOME STUDY COURSE - Starting with the first principles of arithmetic, advancing step by step through the various stages of mathematics, including the rules and calculations for mechanical and electrical problems. New EASY correct methods. Includes plane and solid geometry, trigonometry, algebra, calculus, etc. Practical tests, reference tables and data. How to use slide rule. 752 Pages. 550 Illustrations. Priced at only \$3.

CIRCLE No. 11 IN COUPON

## NEW MACHINISTS AND TOOLMAKERS HANDBOOK

MODERN MACHINE SHOP PRACTICE - 5 PRACTICAL BOOKS IN ONE. New from cover to cover. Tells how to set up and operate lathes, screw and milling machines, shapers, drill presses and all other machine tools. A COMPLETE INSTRUCTOR AND REFERENCE BOOK. 1728 Pages. Fully Illustrated. Priced at only \$6.

CIRCLE No. 12 IN COUPON

## WIRING DIAGRAMS

This book gives the practical facts on wiring of electrical apparatus. It explains clearly and SIMPLY how to wire apparatus for all fields of electricity. Each diagram is complete and self-explaining. Know your HOOK-UPS! 304 Pages. Illustrated. Only \$2.

CIRCLE No. 13 IN COUPON

## REFRIGERATION & AIR CONDITIONING

FOUR BOOKS IN ONE - basic principles, servicing, operation, repair of: 1. Household Refrigeration. 2. Special Refrigeration Units. 3. Commercial & Industrial Refrigeration. 4. Air Conditioning Systems. A GOLD MINE of essential information. Completely up-to-date. 1360 Pages. Fully Illustrated and Indexed. Priced at only \$6.

CIRCLE No. 14 IN COUPON

## THE NEW ELECTRIC LIBRARY

A COMPLETE ENCYCLOPEDIA explaining in the simplest terms the fundamental principles, rules and applications of applied electricity.

A COMPLETE COLLEGE EDUCATION!

Fully illustrated with diagrams and sketches, calculations and tables for ready reference. Questions and answers. Trial tests for practice study and review. All based on the most modern theory.

Vol. 1 - Principles and rules of electricity, magnetism, armatures, repairs. No. 15

Vol. 2 - Dynamos, DC Motors, construction, installation, maintenance, etc. No. 16

Vol. 3 - Testing instruments and tests, storage battery constr. and repairs. No. 17

Vol. 4 - Alternating current, power factor, alternators, transformers. No. 18

Vol. 5 - A.C. Motors, windings, maintenance, converters, switches, fuses, etc. No. 19

Vol. 6 - Relays, condensers, regulators, rectifiers, meters, switchboards, etc. No. 20

Vol. 7 - Wiring, house light and power, circuits, high

tension, plans, code, etc. No. 21

Vol. 8 - Railways, signals, elevators, ignition, etc. No. 22

Vol. 9 - Radio, telephone, telegraph, television, motion pictures. No. 23

Vol. 10 - Refrigeration, illumination, welding, x-ray, electrical appliances, Index. No. 24

7,000 fully illustrated pages. Priced at only \$20 for the ENTIRE SET. Also sold individually for \$2 each.



## ALL TYPES OF BLUEPRINT READING

How to read scales, the standard symbols, detail and assembly prints, working drawings, short cuts, helps, hints and suggestions. THE MAN WHO CAN READ BLUEPRINTS IS IN LINE FOR A BETTER JOB. This book gives you the secret language, step by step in easy stages. 448 Pages. Very Fully Illustrated. Priced at \$3.

CIRCLE No. 25 IN COUPON

## MASONS & BUILDERS GUIDES

A PRACTICAL ILLUSTRATED 4 VOL. SET - Explaining in clear, simple language and profuse illustration, principles, advances, short cuts, trade secrets, based on modern practice - including how to figure and calculate various jobs. Vol. 1 - Brick work, bricklaying, bonding, designs. Vol. 2 - Brick foundations, arches, tile setting, estimating. Vol. 3 - Concrete mixing, grading forms, reinforced stucco. Vol. 4 - Plastering, stone masonry, steel construction, blueprints. 4 Vols. 1440 Pages. 2067 Illustrations. Complete Set only \$8.

CIRCLE No. 26 IN COUPON

## ELECTRIC MOTORS

THIS GUIDE covers the construction, hook-ups, control, maintenance and trouble shooting of all types of motors. Includes armature winding. Explains entire subject in great detail in simple language. Over 1056 Pages of information. 617 Diagrams. All types of motors fully illustrated and indexed for ready reference. Priced at only \$5.

CIRCLE No. 27 IN COUPON

## OIL BURNERS

New, complete, explaining in detail both domestic and industrial oil burners. Includes electrical hook-ups and wiring diagrams. Fully covering the theory, construction, installation, operation, testing, servicing and repair of all equipment. Indexed for ready reference. Over 416 Pages. 320 Illustrations and Diagrams. Only \$2.

CIRCLE No. 28 IN COUPON

## ADDITIONAL IMPORTANT TITLES

The following Audel Guides are all the best in their fields, written in clear simple fashion, all lavishly illustrated. Circle the numbers wanted in the MAIL ORDER COUPON below. All books are sent for FREE EXAMINATION.

No. 29	SHEET METAL PATTERN LAYOUTS.	1152 Pages	\$7.50
No. 30	SHEET METAL WORKERS HANDY BOOK.	448 Pages	2.00
No. 31	MECHANICAL DRAWING GUIDE.	192 Pages	2.00
No. 32	MECHANICAL DRAWING AND DESIGN.	480 Pages	3.00
No. 33	ELECTRONIC DEVICES.	304 Pages	3.00
No. 34	ELECTRICIANS EXAMINATIONS.	272 Pages	2.00
No. 35	ELECTRIC POWER CALCULATIONS.	Page 480	3.00
No. 36	ELECTRIC DICTIONARY 9000 Terms		3.00
No. 37	POWER PLANT ENGINEERS GUIDE	1568 Pages	5.00
No. 38	ENGINEERS AND FIREMANS EXAMS.	544 Pages	2.00
No. 39	OPERATING ENGINEERS LIBRARY 3 Book Set		12.00
No. 40	PUMPS, HYDRAULICS AND AIR COMPRESSORS.	1760 Pages	6.00
No. 41	HOUSE HEATING GUIDE.	1008 Pages	5.00

## MAIL THIS NO-RISK COUPON TODAY!

THEO. AUDEL & CO. - Self Improvement Publishers Since 1879 -  
49 W. 23rd Street, New York 10, N.Y.

Please mail me for 7 days' FREE EXAMINATION the books I have circled at right. I agree to mail \$2 in 7 days on each book or set ordered, and to further mail \$2 a month on each book or set ordered until I have paid the purchase price, plus shipping costs. If I am not completely satisfied with my Audel Guides I may return them.

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

OCCUPATION \_\_\_\_\_

☐ SAVE SHIPPING COSTS! Check here if you enclose complete payment with order. We pay postage charges. You have some return privilege.

1	2	3	4	5	6
7	8	9	10	11	
12	13	14	15	16	
17	18	19	20	21	
22	23	24	25	26	
27	28	29	30	31	
32	33	34	35	36	
37	38	39	40	41	





Easy as A-B-C

# Be Your Own MUSIC Teacher

PLAY ANY INSTRUMENT

LEARN AT HOME THIS QUICK,  
SIMPLE, MONEY-SAVING WAY

**S**IMPLE as A-B-C. Your lessons consist of real selections, instead of tiresome exercises. You read real notes—no “numbers” or trick music. Some of our 1,000,000 students, such as Lawrence Welk, are band LEADERS. Everything is in print and pictures. First you are told what to do. Then a picture shows you how. Then you play it yourself and hear how it sounds. Soon you are playing popular tunes, hymns, classical and any other music.

No special talent or previous training needed. Even if you don't know a single note of music now, you can soon play piano, guitar, accordion, organ, any instrument. Your friends will be amazed!

## STOP CHEATING YOURSELF OF THESE JOYS!

Popularity! New friends. Gay parties. Good times. Career. Extra Money. Understand, appreciate and converse about music. Learn lives and compositions of modern and great masters . . . Relax! Banish worries and frustrations. Satisfy self-expression, creative urge. Gain self-confidence.

### MAIL COUPON FOR FREE BOOK

See for yourself why our course has been successful for

62 years! Read the whole fascinating story of this wonderful course in 36-page illustrated book. For **FREE** copy, mail coupon. No obligation. No salesman will call.  
**U. S. School of Music,  
Studio 152, Port Washington, N. Y.**



Licensed by the N. Y. State Education Dept.

### U. S. SCHOOL OF MUSIC

Studio 152, Port Washington, N. Y.

Please send me your 36-page illustrated Free Book. I'm interested in playing (name instrument).....

☐ I do ☐ I do NOT—have instrument now.

Name.....Age.....  
(please print)

Address.....

City..... Zone..... State.....

## engineering degree in 27 months

Share rewards awaiting college men . . . higher income . . . advancement. Important firms visit Tri-State campus to interview seniors. *Bachelor of Science Degree in 27 Months* in Electrical Engineering (Electronics or Power major), Mechanical, Civil, Aeronautical, Chemical Engineering. *In 36 Months* a B.S. in Business Administration (General Business, Accounting, Motor Transport Management majors). For earnest, capable students. Small classes. More professional class hours. Well-equipped, new and modernized buildings, labs, dorms. Modest costs. Year-round operation. Enter Mar., July, Sept., Jan. Founded 1884. Write J. F. McCarthy, Director of Admissions for Catalog and “Your Career in Engineering and Commerce” Book.



**TRI-STATE COLLEGE**

520 College Avenue • Angola, Indiana

## 75 POWER TELESCOPE \$3.98

New 3 in one telescopes, 3 variable 25X-45X-75X magnification, Brass bound, 25 power for ultra bright images 45 & 75 power for long range. Guaranteed to bring distant stars, moons, objects, sports 75 times closer.



CRITERION CO., Dept. PSB-80, 331 Church St., Hartford, Conn.



## WANT MORE MONEY? GET INTO PHOTOGRAPHY

Coast to coast, high-paying jobs in photography are waiting for people with that “know-how” to fill them. You can quickly, easily qualify at home with the world-famous NYI Learn-by-Doing Method. Write today for free catalog. Also resident training in N. Y. Our 50th Year. Approved for Veterans.

### NEW YORK INSTITUTE OF PHOTOGRAPHY

Dept. 5 10 West 33 St. New York 1, N. Y.

SEE PAGE 249 FOR  
SPLIT LEVEL CONTEST  
WINNERS

## WANTED!

Mechanically Inclined  
Men to Qualify for

## CUMMINS DIESEL FACTORY TRAINING



If you are interested in High Pay Jobs and Advancement in the Diesel field . . . here's your opportunity! Qualified Factory-Trained men are in demand by highway builders, diesel manufacturers, truck line operators everywhere. Interstate can help you qualify for tuition-free Cummins factory training and big pay diesel jobs! Write for complete information about Cummins-approved home training.

### Get the Facts Today!

#### WRITE INTERSTATE TRAINING SERVICE

Dept. A-2, Portland 12, Oregon

RUSH information about Cummins tuition-free Factory Training and approved Home Study programs.

Name.....

Address.....

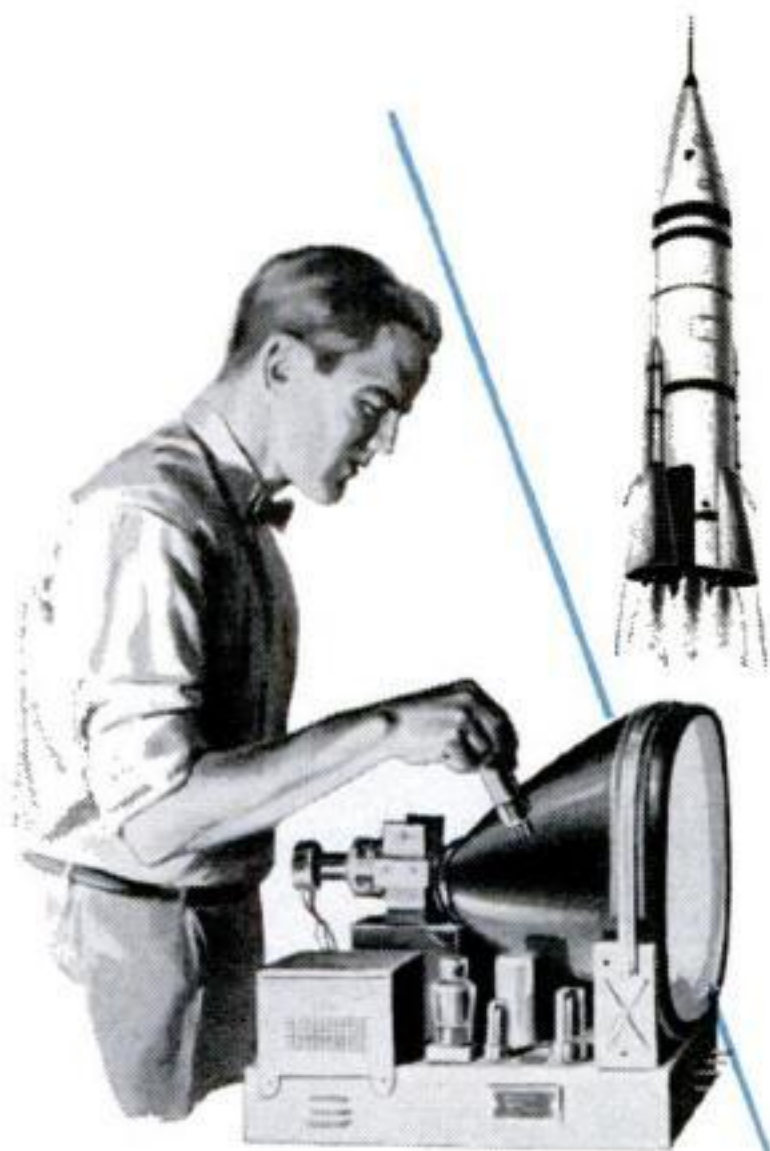
City..... Zone..... State.....



ANOTHER WAY RCA  
SERVES EDUCATION  
THROUGH  
ELECTRONICS



# 6 REASONS WHY RCA TRAINING IN ELECTRONICS can be the smartest investment you'll make in your *entire lifetime!*



**1. You get the finest training-at-home** under the supervision of the RCA INSTITUTES, experts in technical training for over 50 years. The very name "RCA" means dependability, integrity, and scientific advance.

**2. You get comprehensive training** in your choice of four complete, up-to-date Courses... from basic electronics theory to Color TV and Automation.

**3. You get an evaluation of your aptitude** for advanced training. RCA determines, for your benefit, whether you have the requirements for a career in the electronics field.

**4. You get prime quality equipment** as a regular part of your Course... equipment that you keep and use on the job. You never have to take apart one piece to build another.

**5. You get each study group on a pay-as-you-go basis.** Should you wish to interrupt your training at any time, you will not owe RCA Institutes a penny more, unless and until you decide to resume the Course.

**6. You get top recognition — worldwide.** Graduates of RCA Institutes now work for leaders in the electronics field; many have their own businesses. This record is true tribute to the high quality of RCA Institutes training.

Send for this  
64-page Home  
Study Catalog  
**FREE!**



**RESIDENT SCHOOL** Courses in New York City offer comprehensive training in Television and Electronics. Day and Evening classes start four times each year. Detailed information on request.

## RCA INSTITUTES, Inc. Home Study School PS-20

A Service of Radio Corporation of America

350 West Fourth Street, New York 14, N. Y.

Without obligation, send me **FREE** 64-page CATALOG on Home Study Courses. No salesman will call.

Name ..... Age.....  
please print

Address .....

City ..... Zone..... State.....

Korean Vets! Enter discharge date.....

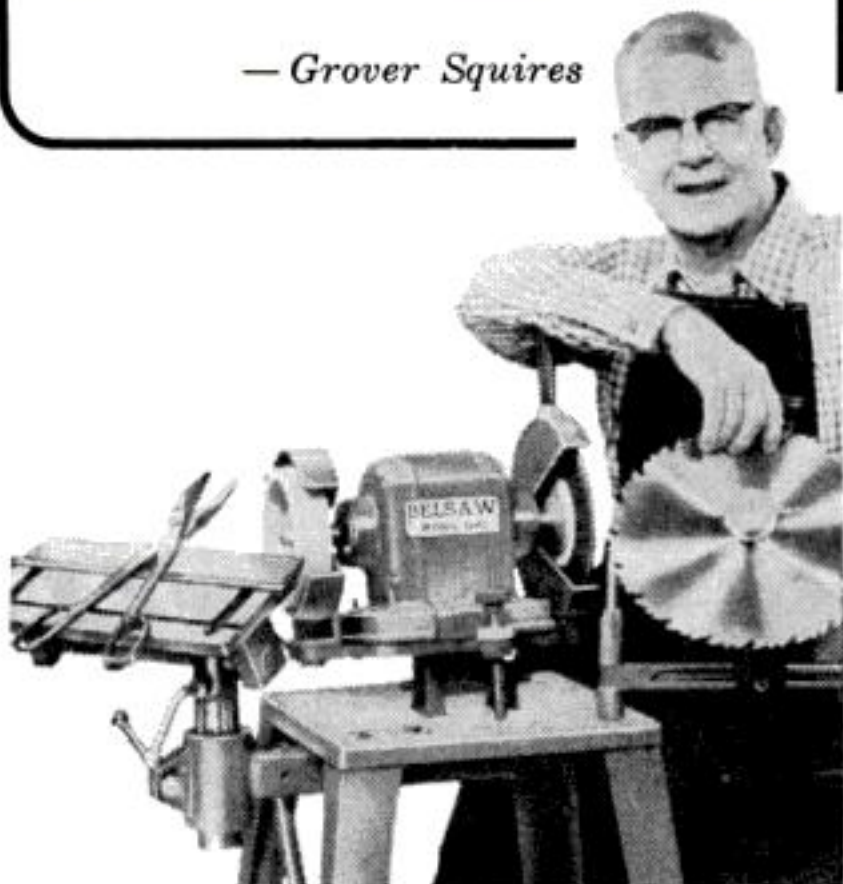
**CANADIANS** — Take advantage of these same RCA courses at no additional cost. No postage, no customs, no delay. Send coupon to:  
RCA Victor Company, Ltd., 5001 Cote de Liesse Rd., Montreal 9, Quebec  
To save time, paste coupon on postcard.



MY SPARE TIME HOBBY MAKES ME

**\$5<sup>00</sup> an hour  
CASH PROFIT**

— Grover Squires



## START YOUR OWN SPARE TIME BUSINESS



You can turn your spare time into Big Cash Profits with your own **COMPLETE SHARPENING SHOP**... Grind saws, knives, scissors, skates, lawn mower blades... all cutting edges. Your Own Cash Business with no inventory... right at home... no experience needed.

**FREE BOOK** tells how you can start your own spare time business while you are still working at your regular job. Low Cost—time payments only \$15.00 a month. Send coupon today.



**BELSAW SHARP-ALL CO**  
700 Field Bldg.,  
Kansas City 11, Mo.

Send Free Book "LIFETIME SECURITY". No obligation.

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_

LEARN TO EARN

**HIGH WAGES**

AS A HEAVY EQUIPMENT OPERATOR!



Secure a high paying future in the exciting construction industry today! Learn to operate bulldozers, draglines, cranes, back hoes, scrapers and motor graders on our actual construction projects!

• ONLY CONTRACTOR OWNED AND OPERATED SCHOOL IN WORLD • ASSOCIATE MEMBER ASSOCIATED GENERAL CONTRACTORS • MODERN EQUIPMENT • V. A. APPROVED FOR G. I. TRAINING • BUDGET PAY PLAN AVAILABLE

**WESTERN NATIONAL**  
SCHOOL  
OF HEAVY EQUIPMENT  
OPERATION

WRITE TODAY  
FOR FREE  
SCHOOL  
CATALOG

Dept. F-1 Box 510  
Weiser, Idaho Phone 910



Switzerland

147



Japan

17

82

WITH CASE

82

WITH CASE

82

WITH CASE

82

WITH CASE

82

WITH CASE

82

WITH CASE

82

WITH CASE

82

WITH CASE

82

WITH CASE

82

WITH CASE

82

WITH CASE

82

WITH CASE

82

WITH CASE

82

WITH CASE

82

WITH CASE

82

WITH CASE

82

WITH CASE

82

WITH CASE

## HOME-IMPORT BUSINESS . . . .

Men, women. Make big profits buying low cost imports abroad (see examples at left) and selling to friends, stores or by mail order. Famous world trader guides you—shows you how to find thousands of exotic imports for full or spare time business, how to **POCKET PROFITS IN ADVANCE ON FOREIGN DROP SHIPMENT PLAN**. Full details FREE! Airmail reaches us overnight. Write Today!

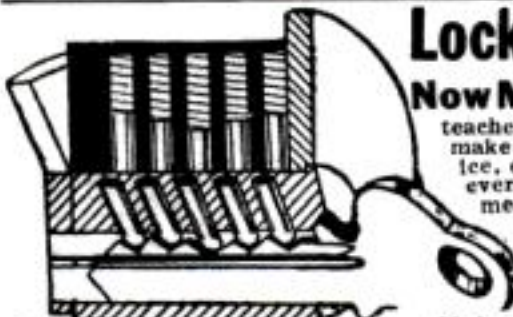
**MELLINGER CO., 1717 Westwood**  
Dept. C242, LOS ANGELES 24, CALIFORNIA

TRAINED AND SKILLED MEN IN

## CLOCK AND WATCH REPAIR

Are Needed in Watchmaking, Electronics, Defense, Aviation, and other technical and precision instrument fields. NOW IS THE TIME TO LEARN THIS VALUABLE TRADE. But, Before You Enroll in Any HOME STUDY Course in Watchmaking, Write for Your Copy of "LEARN THE FACTS."

**KANSAS CITY SCHOOL OF WATCHMAKING**  
1220 Admiral Blvd. Kansas City 6, Missouri



## Locksmithing AND KEY MAKING

**Now Made Easy!** Practical up-to-date course

teaches you how to pick locks, de-code, make master keys, repair, install, service, etc. New self-instruction lessons for every handyman, homeowner, carpenter, mechanic, service station operator, fix-it shop, hardware dealer, gunsmith. 53 easy illustrated lessons. Full price only \$5.95, post-paid; or C.O.D. plus postage. Satisfaction or refund guaranteed.

Complete course \$5.95  
... now only \$5.95  
**Nelson-Hall Co., Dept. BR-1**  
210 S. Clinton St. Chicago 6, Ill.

**WORLD'S LOWEST PRICED CALCULATOR!**  
NEW! NEW! NEW!  
**TOM THUMB ADDING MACHINE**

With beautiful Leatherette carrying case. **MADE IN AMERICA BY AMERICANS**. Beware of cheap imported imitations. Adds Up To One Billion—1,000,000,000. Subtracts—Multiplies—Divides. Mistake Proof—Positively 100% Accurate—Lightning Fast—Shock Proof Solid Steel Mechanism. **GUARANTEED FOR YOUR LIFETIME**

Ideal for Housewives, Shoppers, Students, Engineers and Tax work. Take it to the Super Market—Save \$\$\$ every week. We pay postage if you send check, cash or money order—or just send your name & address and pay postman \$1.97 plus postage. Immediate Delivery—10 Day Free Trial—Satisfaction Guaranteed money refunded by return mail. **Special Gift Offer: 2 Machines for only \$3.49** Agents Wanted—Make easy money selling a Top Quality Calculator at our unbelievably low price.

**TOM THUMB ADDING MACHINE**  
P.O. Box 5066, Dept. F-20, Philadelphia 11, Penna.

Not \$3.95  
But Only **\$1.97** Penna. including 3% Tax.





New **PROFIT-PROVEN\*** Home-Business!

# "I make \$400<sup>00</sup> a week!"



**\*Proves**  
**Mr. J. T. Anderson,**  
**Inglewood, Calif.**

(Notarized statement on file in our office and open to inspection.)



and **READ** what others  
are saying about  
**Screen Print**

"My first attempt at Screen  
Printing netted me \$40.00."  
J.R., Canada

"I would not take \$1,000 for it right  
now. Just what I have been searching  
the world over for" - C.S., Nevada

"Wonderful new method...made \$80.00  
first week...swamped with orders."  
R.T., Florida

"Screen Printing is nothing  
less than fascinating"  
S.M.D., Mass.

**MAKE BIG MONEY, TOO**—printing without a printing press! Learn the secrets of this new **MIRACLE PRINTING METHOD** . . . build a **Big-Pay Business, SPARE or FULL-TIME**, right in your own home. Never before has there been such a golden opportunity to turn pennies into dollars in profit! — to build a successful, prosperous future easily, quickly, and enjoyably—**AT HOME**

**WHAT IS SCREEN PRINT?** It's a new, fascinating technique—so amazingly simple and economical it may soon revolutionize the printing industry! Imagine—after only a few short days, you may print many beautiful professional jobs for **LESS** THAN IT WOULD COST ON A \$5000 PRINTING PRESS!

**SCREEN PRINTING IS FUN . . . EASY!** If you like to work with your hands and make beautiful things, you'll find no Home Business that provides greater enjoyment, relaxation, and **PROFIT**. You'll enjoy every moment . . . creating beautiful printed material that may sell for really **BIG MONEY!**

**NO EXPERIENCE OR COSTLY EQUIPMENT NEEDED!** Few home businesses offer such **BIG PROFITS** for so little time, money, or training! You *don't* need art ability, expensive equipment, or previous experience! You start at home with little or **NO OVERHEAD**. Yet you can print—almost immediately—on **PAPER, GLASS, LEATHER, CLOTH—ANYTHING!** Work with all colors, even the vibrant new **FLUORESCENT "Glow Colors"** that are in such big demand in advertising circles! It's amazing—but true!

**START SPARE TIME—ON A "SHOESTRING"!** Use your spare time to earn up to \$12.50 per hour, right from the start. Earn 2 **INCOMES INSTEAD OF ONE**. Print in your garage, basement, spare room—anywhere! Screen Printing requires little space—won't interfere with your household set-up. Later, when you see the **TREMENDOUS PROFITS** to be made, you may wish to make Screen Printing your full-time occupation. Become your own boss—make **BIG MONEY!** Others are doing it—why can't you?



**HELP FILL THE HUGE, GROWING DEMAND!** Businesses in every city, every community have learned—almost "overnight"—of the amazing quality and economy of **MIRACLE Screen Printing!** You save them up to 50% on many jobs—yet you make up to 500% profit! When the word gets around people come to you—no selling necessary! Because this sensational printing discovery is so new, many Screen Printers sell exclusively by mail!

**WE SUPPLY EVERYTHING YOU NEED!** Every secret, enough materials to start making money almost immediately can be yours! Never before has such a wonderful "profitability" been offered to anyone desiring to start a profitable spare or full-time business of his own! We guide you every step of the way with our Personal Counseling Service & Home Business Plan . . . explain how we have helped others, and how we can help you, too! All the **CONFIDENTIAL**, money-making facts are yours if you **MAIL COUPON** today—while there's still time for you to get in on the ground floor!



**PRINT WITHOUT A  
PRINTING PRESS!**  
OR ANY SPECIAL EQUIPMENT



Print Beautiful **CLOTH, FABRICS, GLASS JARS, NOVELTIES, etc., at home!**

**MIRACLE Screen Print** lets you print on all surfaces, all materials—a big advantage over regular print shops. You provide a service offered only by Screen Printers — may have the entire field to yourself!



PRINT expensive Posters, Banners, Labels, Signs, at home!

Realtors, Political Candidates, business firms, many are discovering that Screen Printing is the best answer to their needs. Be the first in your area to fill the huge demand!



PRINT Colorful ADVERTISING DISPLAYS at home!

Stores, markets, gas stations, theaters—all businesses need eye-catching displays. Ordinary printers simply can't compete, price-wise, with Screen Printers, on many jobs!

# Free!

**COMPLETE REVEALING DETAILS,**  
✓ **Authentic Samples, Proven**  
✓ **Big-Money Opportunity Plan,**  
**Large Illustrated "How To" Booklet.**



Screen Print, Dept. 12 15127 So. Broadway, Los Angeles 61, Calif.

**Learn the Secrets - RUSH COUPON TODAY!**

**SCREEN PRINT CO., Dept. 12**  
**15127 S. Broadway, Los Angeles 61, Calif.**

Gentlemen: Please mail me Free Revealing Details, samples, Opportunity Plan, etc.—All this is sent absolutely Free and sent to me by return mail, I am under no obligation now or ever.

Name

Address

City  Zone  State



# RADIO SHACK *flash!*

## Send Coupon for Latest **FREE** ELECTRONICS Catalog plus every new issue for 1960



Act today! See the newest, the best, the most complete lines of electronic equipment in America—stereo, hi-fi, ham radio, LP records, tapes, optical goods and scores of others. Over 100,000 items—everything for the amateur, the pro, the devotee or just the interested.

Mail the coupon now! We will send you immediately, Free and Postpaid, not only our latest 312 page Electronic Catalog but every new issue for next 12 months—a full year's Free subscription to the finest in electronics and associated products all at famous money-saving Radio Shack prices. Satisfaction guaranteed on every order or your money back.

**RADIO SHACK**  
CORPORATION Dept. 60B4

730 Commonwealth Ave.  
Boston 17, Massachusetts

**Just one** of thousands of  
**RADIO SHACK** buys

Transistor  
Battery Radio  
19.95 Value  
only  
**\$9.95**



Exclusive Radio Shack transistor battery radio. Only 2 5/8 x 4 x 1 1/4 inches in size. Weighs less than 10 ounces. Built-in speaker and ferrite antenna. Conelrad markings, handsome molded case.

Radio Shack Corporation  
730 Commonwealth Ave.  
Boston 17, Massachusetts

Dept. 60B4

Please send me, FREE and POSTPAID, your latest Electronic Catalog. Also send me every new issue for the next 12 months—a full year's subscription FREE.

Name \_\_\_\_\_

Address \_\_\_\_\_

Postoffice \_\_\_\_\_  
or City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_



**QUICK  
DRAW  
BUSCADERO  
BELT &  
SIXSHOOTER  
\$16.95 COMPLETE**

You receive a complete outfit including one top grain cowhide quick draw holster with leg tie and wide buscadero buckle-on belt also of top grain cowhide. Include waist measurement and right or left hand with order. Purchase price also includes one original W&S six shooter. These guns are about 50 years old and they have seen service. However, we guarantee that they are mechanically perfect in every respect, with clean, sharp bores. They are in regular U.S. .45 caliber with ammunition available in every sporting goods store. This outfit will give you the same shooting fun and practice as a \$150 rig. Buscadero belt is our own make and this complete set of gun and belt is a \$30 value.

**COMPLETE SATISFACTION OR YOUR MONEY BACK.**

TO ORDER: Send check, cash or M.O. \$5 deposit for C.O.D. Shipped Exp. Coll. F.O.B. Los Angeles. Enclose signed statement: Am not alien, never convicted crime of violence, not under indictment or fugitive. Am 21 or over. Mass., Mo., Mich., N.Y., N.J., N.C., R.I., Omaha, N. Orleans, require permit. In Calif. order thru local dealer. Dealers inquire.

**THE ELLNER CO.** Dept. 26E  
1206 Maple St., Los Angeles 15, Calif.



## NO JOB WORRIES

PLASTEX INDUSTRY needs manufacturers on small scale for big production of Lamps, Clock Stands, Art Goods, Novelties in Plastic Marble imitation. No Experience necessary. 1/2c material makes regular 10c store sellers. Moulds furnished for fast production. Small investment brings good profit. Big wholesale orders now being placed. Ambitious men have chance for real prosperity and job security. Our NEW FREE booklet will interest and benefit you.

PLASTEX INDUSTRIES, Dept. 2, 3400 Third Ave., New York 56, N. Y.

## START NOW — EARN TOP PAY

Graduates in Auto Mech., Diesel Mech., Welding, Body & Fender, Refrig., Air-Conditioning, and Mach. Tool & Die earn highest pay. Train in the largest trade school in the world. Day—evenings—part time. Free Placement assistance while training and after graduation. Veteran Approved.

Write for details. Box B

**GREER** shop training

2234 S. Michigan Ave., Chicago 16, Ill.

## FREE GERMAN STEEL HUNTING KNIFE



4-INCH BLADE

We give you handiest hunting and fishing knife you've ever had! Has 4-INCH LONG highly tempered steel blade—VERY SHARP! Attractive handle. We send knife FREE to acquaint you with our below-wholesale bargains. Please send 25c for handling. NO LIMIT—but send 25c handling for each knife. Order TODAY! HUNTING KNIFE, Dept. K-461, Box 881, St. Louis, Mo.

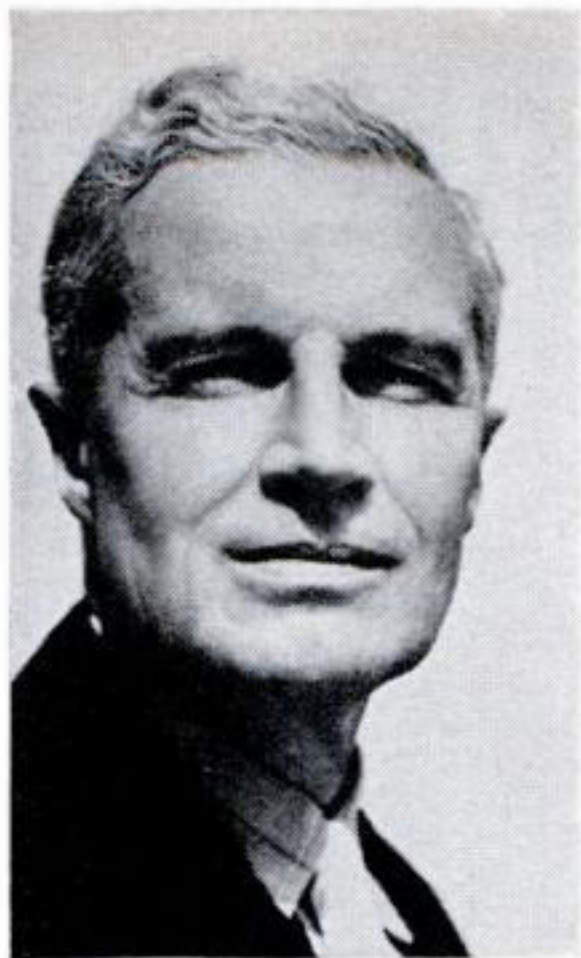
## FREE OUTFIT STARTS YOU IN BIG MONEY SHOE BUSINESS!



Run your own profitable "shoe store" business from home! Represent fast growing million dollar firm in spare or full time. We give you—FREE—complete Starting Outfit that makes you \$217 EXTRA each month for just 2 easy orders a day. Feature 195 fast-selling dress, sport, work shoe styles for men, women. Air-cushion shoes, many special features! Sizes 2 1/2-15—AAAA to EEEE. Sell to friends and folks where you work. Rush postcard for FREE Outfit!

**MASON SHOE**, Dept. G-19, Chippewa Falls, Wisconsin





# I'd like to give this to my fellow men... while I am still able to help!

I was young once, as you may be—today I am older. Not too old to enjoy the fruits of my work, but older in the sense of being wiser. And once I was poor, desperately poor. Today almost any man can stretch his income to make ends meet. Today, there are few who hunger for bread and shelter. But in my youth I knew the pinch of poverty; the emptiness of hunger; the cold stare of the creditor who would not take excuses for money. Today, all that is past. And behind my city house, my

summer home, my Cadillacs, my Winter-long vacations and my sense of independence—behind all the wealth of cash and deep inner satisfaction that I enjoy—there is one simple secret. It is this secret that I would like to impart to you. If you are satisfied with a humdrum life of service to another master, turn this page now—read no more. If you are interested in a fuller life, free from bosses, free from worries, free from fears, read further. This message may be meant for you.

**By Victor B. Mason**

I am printing my message in a magazine. It may come to the attention of thousands of eyes. But of all those thousands, only a few will have the vision to understand. Many may read; but of a thousand only you may have the intuition, the sensitivity, to understand that what I am writing may be intended for you—may be the tide that shapes your destiny, which, taken at the crest, carries you to levels of independence beyond the dreams of avarice.

Don't misunderstand me. There is no mysticism in this. I am not speaking of occult things; of innumerable laws of nature that will sweep you to success without effort on your part. That sort of talk is *rubbish*! And anyone who tries to tell you that you can *think* your way to riches without effort is a false friend. I am too much of a realist for that. And I hope you are.

I hope you are the kind of man—if you have read this far—who knows that anything worthwhile has to be *earned*! I hope you have learned that there is no reward without effort. If you have learned this, then you may be ready to take the next step in the development of your karma—you may be ready to learn and use the secret I have to impart.

## **I Have All The Money I Need**

In my own life I have gone beyond the need of money. I have it. I have gone beyond the need of gain. I have two businesses that pay me an income well above any amount I have need for. And, in addition, I have the satisfaction—the deep satisfaction—of knowing that I have put more than three hundred other men in businesses of their own. Since I have no need for money, the greatest satisfaction I get from life, is sharing my secret of personal independence with others—seeing them achieve the same heights of happiness that have come into my own life.

Please don't misunderstand this statement. I am not a philanthropist. I believe that charity is something that no proud man will accept. I have never seen a man who was worth his salt who would accept

something for nothing. I have never met a highly successful man whom the world respected who did not sacrifice something to gain his position. And, unless you are willing to make at least half the effort, I'm not interested in giving you a "leg up" to the achievement of your goal. Frankly, I'm going to charge you something for the secret I give you. Not a lot—but enough to make me believe that you are a little above the fellows who merely "wish" for success and are not willing to sacrifice something to get it.

## **A Fascinating and Peculiar Business**

I have a business that is peculiar—one of my businesses. The unusual thing about it is that it is needed in every little community throughout this country. But it is a business that will never be invaded by the "big fellows". It has to be handled on a local basis. No giant octopus can ever gobble up the whole thing. No big combine is ever going to destroy it. It is essentially a "one man" business that can be operated without outside help. It is a business that is good summer and winter. It is a business that is growing each year. And, it is a business that can be started on an investment so small that it is within the reach of anyone who has a television set. But it has nothing to do with television.

This business has another peculiarity. It can be started at home in spare time. No risk to present job. No risk to present income. And no need to let anyone else know you are "on your own". It can be run as a spare time business for extra money. Or, as it grows to the point where it is paying more than your present salary, it can be expanded into a full time business—overnight. It can give you a sense of personal independence that will free you forever from the fear of lay-off, loss of job, depressions, or economic reverses.

## **Are You Mechanically Inclined?**

While the operation of this business is partly automatic, it won't run itself. If you are to use it as a stepping stone to independence, you must be able to work with your hands, use such tools as hammer and screw driver, and enjoy getting into a pair of blue jeans and rolling up your sleeves. But two hours a day of manual work will keep your "factory" running 24 hours turn-

ing out a product that has a steady and ready sale in every community. A half dollar spent for raw materials can bring you six dollars in cash—six times a day.

In this message I'm not going to try to tell you the entire story. There is not enough space on this page. And, I am not going to ask you to spend a penny now to learn the secret. I'll send you all the information, free. If you are interested in becoming independent, in becoming your own boss, in knowing the sweet fruits of success as I know them, send me your name. That's all. Just your name. I won't ask you for a penny. I'll send you all the information about one of the most fascinating businesses you can imagine. With these facts, you will make your own investigation. You will check up on conditions in your neighborhood. You will weigh and analyze the whole proposition. Then, and then only, if you decide to take the next step, I'll allow you to invest \$15.00. And even then, if you decide that your fifteen dollars has been badly invested I'll return it to you. Don't hesitate to send your name. I have no salesmen. I will merely write you a long letter and send you complete facts about the business I have found to be so successful. After that, you make the decisions.

## **Does Happiness Hang on Your Decision?**

Don't put this off. It may be a coincidence that you are reading these words right now. Or, it may be a matter that is more deeply connected with your destiny than either of us can say. There is only one thing certain: If you have read this far you are interested in the kind of independence I enjoy. And if that is true, then you must take the next step. No coupon on this advertisement. If you don't think enough of your future happiness and prosperity to write your name on a postcard and mail it to me, forget the whole thing. But if you think there is a destiny that shapes men's lives, send your name now. What I send you may convince you of the truth of this proverb. And what I send you will not cost a penny, now or at any other time.

**VICTOR B. MASON**

1512 Jarvis Ave., Suite M-3-B  
CHICAGO 26, ILLINOIS



# MEN PAST 40

## Afflicted With Bladder Trouble, Pains in Back, Hips, Legs, Nervousness, Tiredness.

If you are a victim of these symptoms, your trouble may be due to Glandular Inflammation. A constitutional Disease that requires special types of medical treatment. Neglect of such Inflammation causes men to grow old prematurely and before their time.

Most men, if treatment is taken in time, can be successfully NON-SURGICALLY treated for Glandular Inflammation. If the condition is aggravated by lack of treatment, surgery may be the only chance.

## NON-SURGICAL TREATMENTS

The NON-SURGICAL New Type treatments used at the Excelsior Medical Clinic are the result of discoveries in recent years of new techniques and drugs, plus over 20 years research by scientific technologists and doctors.

Men from all walks of life and from over 1,000 communities have been successfully treated here at Excelsior Springs. They found soothing and comforting relief and new health in life.

### EXAMINATION AT LOW COST

When you arrive, our Doctors, who are experienced specialists, make a complete examination. You then decide if you will take the treatments needed, which are so mild, hospitalization is not needed—a considerable saving in expense.

### Write For FREE BOOK

The Excelsior Medical Clinic has published a New FREE Book that deals with diseases peculiar to men. It could prove of utmost importance to your future life. Write today. No obligation.

**RECTAL-COLON**  
Are often associated with Glandular Inflammation. These disorders, we can successfully treat for you, at the same time we treat Glandular Inflammation.

**REDUCIBLE HERNIA**  
Is also amenable to a painless Non-Surgical treatment that we have developed. Full details of this treatment given in our Free Book.



**EXCELSIOR  
MEDICAL CLINIC**  
Dept. B6250  
Excelsior Springs, Mo.

Gentlemen: Kindly send me at once, your New FREE Book. I am interested in full information. (Please Check Box)

- ☐ Glandular Inflammation      ☐ Hernia  
☐ Rectal-Colon

Name.....

Address.....

City..... State.....

## Pocket Transistor Radio

Mighty Midget  
\$5.95



Low Price! Smart Design! Size of cigaret package, yet thrilling performance. Weighs only 3 ounces. Listen to music, sports, news, variety programs on your personal portable.



Modern ivory & blue plastic case, gold metal grille. Complete broadcast band. On-off switch one end. Uses standard penlight cells (included). Guaranteed. Complete, ready for immediate playing. Postpaid Only... \$5.95

JOHNSON SMITH & CO. Dept. 874 Detroit 7, Michigan

## Catalog of 2900 Novelties 10c



New Send 10c for amazing catalog of novelties, live animals, scientific supplies, hobbies, funmakers, planes & boats, looms, magic tricks, joke articles, unusual seeds, gadget timesavers, cameras, optical goods, projectors, movies, lucky jewelry, religious novelties, disguises, musical instruments, stamps, coins, puzzles, fortune tellers, radios, auto & bike accessories, telescopes, magnifiers, compasses, banks, smokers' gadgets, artists' supplies, printing sets, engines, motors, shockers, knives, billfolds, fireworks, guns, rifles, sports, books, games, plants, etc. Send name, address & 10c to: JOHNSON SMITH & CO., Dept. 874 Detroit 7, Michigan

## LAW FREE BOOK THE LAW TRAINED MAN

Write today for a FREE copy of illustrated law book, "THE LAW-TRAINED MAN," which shows how to earn the professional Bachelor of Laws (LL.B.) degree through home study of the famous Blackstone Law Course. All necessary books and lessons provided. Moderate cost; convenient monthly terms. Write for FREE law training book today.

**Blackstone School of Law, 307 N. Michigan Ave.**  
Founded 1890 Dept. 122, Chicago 1, Illinois

## "YOU ARE UNDER ARREST!"



### Help Bring Crooks to Justice Through Scientific CRIME DETECTION!

We have taught thousands this exciting, profitable, pleasant profession. Let us teach you in your own home. Learn Finger Printing, Firearms Identification, Police Photography, Secret Service Methods thoroughly, quickly, at small cost. Over 800 of all American Bureaus of Identification employ I.A.S. students or graduates. Write for FREE "Blue Book of Crime."

(A Correspondence School Since 1916)  
INSTITUTE OF APPLIED SCIENCE, 1920 Sunnyside Ave., Dept. 1362, Chicago 40, Ill.



## FREE

### MUSCLE BUILDING INFORMATION

Sensational New Methods

Less Time—Less Effort—Better results

**BODY-TONE, Box 638-E, North Miami 61, Fla.**

## MAKE EXTRA CASH

### SHARPENING LAWN MOWERS THE MODERN WAY



\$275.00  
F.O.B. Pasadena

Start your own shop! Full or spare time. Earn many dollars in a short time... average \$5.00 per hour. Many mowers need sharpening. With MODERN'S Extra Heavy Duty LAWN MOWER SHARPENER AND BED KNIFE GRINDER you have 6 machines in one. All operations are done quickly and easily. You make money from the start. Write for free details.

**MODERN MFG. CO.**  
160 N. Fair Oaks Ave. Dept.  
Pasadena, California 11-4



LEARN FAST!  
LEARN RIGHT!

**3 Great Rinehart training books**  
to help You get ahead . . .

## ← LEARN OIL BURNER REPAIR!

*Solve oil heat problems of all kinds!*

Save real money by repairing, adjusting or even redesigning your own oil burner installation. Earn good pay by doing this work for others!

This new, 400-page manual, **DOMESTIC OIL BURNERS AND OIL HEAT** with its more than 300 pictures and diagrams trains you for fast, accurate service on all types in common use—even without a lot of previous experience. Teaches you

all about puzzling oil burner controls. Shows how to make heat loss surveys and design economical heating systems accordingly. Includes full details on firing rates; chimneys & drafts; piping, wiring and dozens of other subjects. Duo-Spiral binding puts BOTH pictures and related text side by side for easy use on the job.

Price \$6.95—or see money-saving offer in coupon.

## ← REPAIR ELECTRIC MOTORS!

*It pays to train for something different*

The electric motor is the "heart" of all electrified appliances and machinery—and this famous **ELECTRIC MOTOR REPAIR** manual is a complete training guide to help you cash in on this fast-growing repair field. Shows step by step how to handle all repair jobs (including complete rewinding) on practically any AC or DC motor or gener-

ator, small or large. Includes motor controls. Has 560 pages and over 900 how-to-do-it pictures with handy duo-spiral binding. When a specific motor comes in for repairs just look it up. Pictures and text tell what to do—and exactly how to do it.

Price \$6.95—or see money-saving offer in coupon.

## ← REPAIR ELECTRIC APPLIANCES!

*Save on repair bills..earn in spare time!*

This 370-page Rinehart **ELECTRICAL APPLIANCE REPAIR MANUAL** shows you how to do the toughest repair jobs as well as the easy ones—even if you've never fixed an appliance before! Gives clear how-to-do-it instructions on every modern appliance—irons, toasters, ranges, cleaners, mixers, washers, ironers, clocks, ra-

zors and all the rest. Handy charts help you locate troubles fast. Simple home-made test tools are described. Gives you the "know how" you need to fix your own appliances—or to build a profitable full or part time repair business.

Price only \$5.00 separately. See money-saving offer in coupon.

**DO IT  
YOURSELF!**

**TEAR OUT AND MAIL FOR 10 DAY FREE EXAMINATION**

# SAVE \$1.90

... get all three books ...  
**A COMPLETE, 1330-PAGE  
HOW-TO-DO-IT LIBRARY!**

☐ CHECK HERE to order all three books at special price of only \$17.00 plus postage. (Regular price \$18.90—you save \$1.90!) Payable at rate of \$5.00 after 10 days if you decide to keep books and \$4.00 per month for 3 months. Save even more! Send cash with order and we pay postage. 10-day money-back guarantee if books are returned.

OUTSIDE U.S.A.—Cash only. Add 50¢ to price of each book. All 3 books \$18.50. 10-day money-back guarantee.

Dept. PS-20, RINEHART & CO., Inc.  
232 Madison Ave., New York 16, N. Y.

Send books checked for no-risk examination. In 10 days, I will send price indicated plus postage or return books and owe you nothing. (Send cash with order and we pay postage—same 10-day return privilege.)

- ☐ **DOMESTIC OIL BURNERS & OIL HEAT**.....\$6.95  
☐ **ELECTRIC MOTOR REPAIR**.....\$6.95  
☐ **ELECTRICAL APPLIANCE SERVICE MANUAL**.....\$5.00

NAME.....

ADDRESS.....

CITY, ZONE, STATE.....

**YOU'LL NEVER REGRET MONEY INVESTED IN TRAINING YOURSELF FOR A BETTER JOB!**



# DRAFTSMEN



**CASH BIG  
PAY CHECKS!**

**Train Now for  
more success,  
greater security**

**LEARN AT HOME IN SPARE TIME  
(or at college in Chicago)**

Check the want ads in any newspaper—SEE the big-pay opportunities open to you as a draftsman. What's more, you can learn this well-paid, prestige profession at home—quickly, easily! No special talent needed! Get complete, step-by-step Chicago Tech lessons in the mail, spend a few pleasant hours studying each week. In a short time you'll be a well-trained draftsman, ready to take your pick of many good jobs. Act now!



**FREE INFORMATION—MAIL COUPON TODAY!**  
Get **FREE TRIAL LESSON** plus information about C.T.C. practical training. Learn what successful Chicago Tech graduates say about high pay and opportunities in drafting. No charge, or obligation.

## CHICAGO TECHNICAL COLLEGE

**B-230 Tech Bldg., 2000 So. Michigan Ave.  
Chicago 16, Illinois**  
Mail me **FREE Lesson** with information about big opportunities in **DRAFTING**.

Name ..... Age.....  
Address .....  
City ..... Zone..... State.....

**ELMER'S  
GUIDE to  
GOOD  
GLUING**

**FREE**

**for glue-it-yourselfers!**

The ins and outs of gluing. Hints, tips and short-cuts. Tells you what glue to use for every job indoors and out. Send a stamped, self addressed envelope for your free copy. The Borden Company, 350 Madison Ave., N.Y. 17, N.Y.

# BASS FISHERMEN WILL SAY I'M CRAZY—*until they try my method!*

**JUST ONE TRIAL WILL PROVE THAT I MAKE  
EVERY FISHERMAN'S DREAM COME TRUE!**

I have no fishing tackle to sell, I make a good living out of my profession. But fishing is my hobby. And because of this hobby, I discovered a way to get those giant bass—even in waters most fishermen say are "fished out."

I don't spin, troll, cast or use any other method you ever heard of. Yet, without live or prepared bait, I can come home with a string of 5 and 6 pound beauties while a man twenty feet away won't even get a strike. You can learn my method in a few minutes. It is legal in every state. All the equipment you need costs less than a dollar and you can get it in any local store. The chances are no man who fishes your waters has ever used my method—or even heard of it. When you have tried it—just once—you'll realize what terrific bass fishing you've been missing.

Let me tell you about this method—and explain why I'm willing to let you try it for the whole fishing season without risking a single penny of your money. There is no charge for this information—now or any other time. But I guarantee that the facts I send you can get you started toward the greatest bass fishing you have ever known. Send me your name today—letter or postcard. You've got a real fishing thrill ahead of you. Eric W. Fare, Highland Park 18, Illinois.

**Million Dollar Inventory — All Famous Brands**



**SAVINGS NEVER LESS THAN 50% UP TO 70% OFF REGULAR PRICES**

**HEADQUARTERS FOR ALL SPORTS CAR TIRE SIZES**

**→ SEND FOR YOUR FREE CATALOG! ←**

**RELIABLE TIRE CO. • 730 MORGAN BLVD.  
CAMDEN 4, N. J.**



## BARBELLS

**100  
POUND  
SET  
\$12.80**

Extra  
Plates Only  
12c Pound

**140-Pound, CHROME DELUXE Barbell-Dumbbell set only \$19.80.**  
This is our feature set and is the finest ever manufactured.  
Training with adjustable weight is the **BEST** way to keep fit; the **ONLY** way to develop great strength and a perfect body. As the oldest and best equipped barbell company, BUR gives value and prices no one can equal.

**SEND FOR FREE CATALOG.**

**BUR BARBELL CO.**

**Lyndhurst 5, New Jersey**

## Get Yourself **FIXED** FOR LIFE in the Big Pay Shoe Business!

It's no trick at all to make big money—**FULL OR SPARE TIME**—with the only shoe line featuring baby shoes in addition to shoes for all the family with new Family Discount plan. Lifetime security. Amazing new "Spring-Step" cushion invention proves it by actual demonstration. Only **ORTHO-VENT** has it! There is no other shoe in the world like it. Repeat orders are sure, steady. One try and a customer is sold for life. Profits are **BIG**. Orders are sure and easy with the most amazing 2-minute demonstration in the history of the shoe business. No experience needed. No investment to make. Everything, including actual cut-a-ways, furnished free! Be the big-pay **ORTHO-VENT** man in your territory. Write **TODAY!**

**ORTHO-VENT SHOE COMPANY**  
402 BRAND RD. SALEM, VIRGINIA



**I'LL  
PUT UP  
THE  
MONEY**

**I GIVE  
PRODUCERS  
THEIR OWN  
SHOES AS A  
Bonus!**



## Beauty by Colorcrete Can Earn High Incomes



Beautifying buildings by Colorcrete is a business opportunity awaiting men of modest capital everywhere. Owners of homes, stores, motels, schools — almost any type of construction—are looking for means to give lifetime eye-appeal to drab or dirty concrete, stucco and similar masonry surfaces. Colorcretors can do such jobs, in little time and at little cost, and pocket generous profits. Colorcrete is a cementitious material, applied by air pressure. Tough, tenacious, enduring; 30 colors. Investigate this low-investment enterprise by writing for the Opportunity Book.

COLORCRETE INDUSTRIES, INC.  
572 Ottawa Ave., Holland, Mich.

**COLORCRETE**

## NEW FALSE PLATE FROM YOUR OLD ONE IN 18 HOURS



AS LOW AS \$14.95

Send us your old broken, cracked or loose plates and we'll transform them into new lightweight wonder plastic plates. NO IMPRESSIONS needed with our revolutionary method. We use your own old plates. We remake them completely in only 18 hours. Missing teeth carefully matched and replaced. We GUARANTEE TO SATISFY YOU OR REFUND YOUR MONEY.

**SEND NO MONEY**—Send us your name today and we'll RUSH COMPLETE DETAILS. Begin to enjoy life right now. Clip this Ad; save it and send for free facts.

**CHICAGO DENTAL PLATE LABORATORY • Dept. PS260**  
30 N. Dearborn St. • Suite 714 • Chicago 2, Ill.

## ENGINEERING

## DEGREE IN 27 MONTHS

Students given option of studying engineering under accelerated program leading to Bachelor of Science Degree in 27 months; or the standard four-year program leading to Bachelor of Engineering Degree in 36 months. The B. S. degree in Mathematics, Chemistry, or Physics (including Nuclear Physics) may be earned in 36 months. By attending classes year-round, students can graduate in 3 years and have one year of experience and income in the time usually needed to complete a four-year college course. Preparatory courses. Thorough, practical program. Individualized instruction.

Keeping pace with progress in science and engineering. Campus, dorms, gym, playing fields. Summer faculty. 2,000 students. New Dana Science Building. Low tuition. Earn board. G.I. approved. Enter March, June, Sept., Dec. Students from 50 states, 40 foreign countries. Send coupon for free catalog, full information. Enroll now!

## INDIANA TECHNICAL COLLEGE

620 E. Washington Boulevard, Fort Wayne 2, Indiana

Please send me free information on 27 mo. B.S. DEGREES in:

☐ Aeronautical ☐ Chemical ☐ Civil ☐ Electrical  
☐ Mechanical ☐ Electronics

on 36 mo. B.E. DEGREES in:

☐ Aeronautical ☐ Chemical ☐ Civil ☐ Mechanical  
☐ Electrical (Power or Electronics) ☐ Metallurgical

on 36 mo. B.S. DEGREES in:

☐ Mathematics ☐ Chemistry ☐ Physics

Name.....

Address.....



**MEN! Make up to  
\$1,000<sup>00</sup>  
IN A MONTH!**

## without "SELLING"

Sensational Demand for Low-Priced Fire Alarm PLUS Sure-Fire "No-Selling" Plan Offers Ambitious Men Huge Profit Opportunities

## AMAZING NEW INVENTION



Even beginners who never sold anything in their lives are cleaning up unbelievable profits with the first practical effective, low priced Fire Alarm ever invented . . . needed, wanted in homes, factories, offices, stores, on farms, for boats, everywhere. Professional salesmen are making biggest profits in years! Later in this ad I'll tell you about the plan that's producing orders for 1 to 12 Fire Alarms per sale from 8 out of 10 prospects . . . without selling. Here are the facts about the Fire Alarm. It hangs on the wall like a picture—no wiring, no installation. It's always on guard . . . It 'smells' a fire before danger point. When temperature rises, Fire Alarm goes off automatically howls loud warning that can be heard 1/5 mile wakes up soundest sleeper, give precious time to put out fire, call fire department, or escape. And it sells for only \$4.95 with profit up to \$2.70 on each one.

## Nearest Thing to AUTOMATION SELLING



With our field-tested plan customers sell themselves. No cold canvassing. No hard selling. It's the nearest thing to 'Automation Selling.' Imagine a sales plan even a child can use successfully because the sales tools we give you (and which you leave with your prospects) do all your selling even while you sleep! No room here to give you all the details but if you want big money fast rush the coupon now.

## Make This Lighted-Match Demonstration

Sensitive! Lighted match triggers Alarms in 3 seconds.

## Free Sales Kit

Send no money. Just rush coupon below for all the exciting moneymaking facts, complete Illustrated Sales Kit, everything you need to make money your first day. Learn how selling only 20 Fire Alarms a day pays you

Made \$26.52  
in 3 Hours!

"Received first shipment about noon. Worked 3 hours and made \$26.52 profit. It's a terrific seller!"  
—Stanley



\$1,080.00 profit in a month. No competition anywhere. Get in on the ground floor now. Rush this coupon.

## MERLITE INDUSTRIES, Inc.

(ALARM DIVISION)

114 E. 32nd St., Dept. F-16K

New York 16, N. Y.

ALVIN WESLEY, Sales Manager  
Merlite Industries, Inc. (Alarm Division)  
114 E. 32nd St., Dept. F-16K, New York 16, N. Y.

Rush FREE SALES KIT and full details about your "No-Selling" plan which gives me opportunity to make up to \$1,000.00 in a month without cold canvassing and hard selling—automatically. I am not obligated.

Name.....

Address.....

City.....Zone.....State.....

In Canada: Mopa Co., Ltd., 371 Dowd St., Montreal 1, P.Q.



Exclusive with Scott-Mitchell  
Zerem 8 in 1  
**SOCKET WRENCH**



Available in Inches or Millimeters  
One single drop forged steel wrench has the 8 most popular sized sockets to do every conceivable nut tightening job on car, in home, shop or industry. Instant swiveling action of socket head brings desired size into position—saves precious time, money and space—and there's no danger of losing sockets. Overall length 9 1/4". Available in 7/16, 1/2, 9/16, 19/32, 5/8, 11/16, 3/4 and 7/8 inch SAE Openings OR 11, 13, 14, 15, 16, 17, 19, and 22 Millimeter Openings. Precision made in West Germany. Specify inches or mm when ordering. pp. & hdlg. plus 35c

**\$3.98**

Rugged 6000 Lb. Test  
**Nylon Tow Cable**



If ever stuck in snow, mud or ditch, there's nothing handier to have in your car than a super-strong. All Nylon Tow Cable. Test proven to over 6000 lbs. pull, more than enough for even the biggest trucks and cars. One end has heavy steel snap clamp while other end is looped. Measures 15 feet long. Also invaluable in home and for industry.

**\$2.98**

plus 25c pp. & hdlg.

Famous Manufacturer's CLOSE-OUT  
**CIRCULAR SAW BLADES**

6"-7"-8" only **99c** ea.

plus 20c ea. blade for pp. & hdlg.

Crosscut—Rip—Combo



Here's a really unusual buy for every home craftsman. These "famous name" blades are made of tough, special purpose steel by a specially patented process. Guaranteed to fit most radial and portable saws. Perfect balance is your assurance of clean cutting through all varieties of wood and wood laminates plus aluminum, magnesium, formica, flexboard, plastics, rubber, lucite and similar materials. Blades available with 1/2" and 3/4" bore (bushings). Specify size and type of blades (crosscut, rip or combination) and bushing size when ordering. Only 99c plus 20c pp. & hdlg. for each blade.

**FAST—Powerful—Durable  
SINGLE HAND WRENCHES**



Time is money and these versatile Single Hand Wrenches can outperform in speed and service any ordinary wrench. Jaws snap back on tempered steel spring and solidly grasp any object to be tightened or loosened. Wrenches made of Drop Forged Steel with polished steel heads. 10" wrench jaws open to 1 1/2"; 8" wrench to 1 1/4" and 6" wrench to 3/4". A really necessary set for every home owner and mechanic.

**\$2.98**

Complete set of 3 wrenches—plus 35c pp. & hdlg.

Illumination and Power Anywhere Around the House!

**New Cordomatic MOBILE-LITE REEL**



**\$10.95**  
ppd

The versatile new Mobile-Lite throws a wide, bright beam of light wherever it's needed... and its handy built-in electric outlet provides power for tools or appliances. Just carry the Mobile-Lite where you want it and swivel the light for best illumination. The 20 ft. cord locks at any desired length... then retracts automatically. Features Universal Swivel which allows complete lighting flexibility... Snap Open Guard for quick bulb change. Perfect for odd jobs in basement, garage, attic—anywhere around the house... Hanging hook on back of case permits wall mounting. Accommodates 150 watt reflector flood, spotlight or incandescent bulb (not included).

Safe, Automatic Electric Service Wherever Needed!



**\$8.95**  
ppd

INDOORS—OUTDOORS—ALL AROUND THE HOUSE  
**New Cordomatic PORTABLE OUTLET REELS**

Just plug in cord... carry the portable outlet reel where you want to use it. 15 ft. cord pulls out to any desired length... locks... automatically retracts when portable outlet reel is not in use. 3-way outlet operates several appliances, tools or other electrical equipment from the same cord.

Cordomatic Products Attractively Packaged in Gift Cartons Suitable for all Occasions.

Send Check or M.O. If C.O.D. Fees Extra  
**MONEY BACK GUARANTEE**

**SCOTT-MITCHELL HOUSE, INC.**

Dept. HC27 415 S. Broadway Yonkers, N. Y.

**221 STAMPS 25¢**  
plus 88 FLAGS OF THE WORLD  
plus PLANET MAIL SOUVENIR SHEET

Poland  
Mushroom  
Triangle



Cayman Islands Cat Boat



Look what you get for only 25¢! You get the stamps shown here—plus Indonesia "Wild Cow" Stamp, Germany "Sputnik", Transvaal King Edward (over 50 years old), French Antarctica bird set, St. Pierre, Grand Comoro, etc. Total 221 stamps—all different! You also get 88 Flags of the World in full color—plus unique Planet Mail Souvenir Sheet. All this for 25¢ to introduce our Bargain Approvals. Midget Encyclopedia of Stamps included FREE.

Send 25¢ Today. ASK FOR LOT EH-34  
ZENITH CO., 81 Willoughby St., Bklyn 1, N.Y.

Colombia  
Miss  
Universe



**RUPTURE!**



An amazing Air-Cushion Invention allows body freedom at work or play. Light, neat, cool, sanitary. Durable, cheap. Day and night protection helps Nature support weakened muscles gently but surely. No risk. Sent on Trial! Write NOW for free Booklet and Proof of Results. All correspondence confidential.

Brooks Company, 144-C State St., Marshall, Mich.



**SUPER JU JITSU**

Now get tough double quick!

A course of instruction in the art of practicing and using this method of applying LIGHTNING-QUICK Super Ju Jitsu. Be Dangerous! These amazing lessons show you how it's done... in a big illustrated home-study course. The weapons are just your BARE HANDS—they can be used effectively if you know how and practice the art. Easy to learn; quick. Full 76-lesson course only \$5.95 postpaid—or COD, plus postage. Satisfaction or your money back guaranteed! Order "Super Ju Jitsu Course," Nelson-Hall Co., 210 S. Clinton, Dept. 8BP-1, Chicago 6, Ill.

**Secrets of VENTRILOQUISM  
Now Revealed!**



Easy to learn in 60 to 90 days with our Home Study Course. **RESULTS GUARANTEED.** Make Money! Be Popular! Have Fun! Big Opportunity! Radio, Television, Stage Appearances! For Free Information regarding price and terms, WRITE. You must state your age. Dummy Catalog 25c. **MAHER HOME COURSE OF VENTRILOQUISM** Box 36, Studio PS-2, Kensington Station Detroit 24, Michigan

**STUDY TO BE A DOCTOR  
of Psychology or Metaphysics**

Obtain a Ps.D., Ms.D., or Ph.D. Be a Teacher, Lecturer or Accredited Practitioner. Teach others how to achieve Health, Happiness and Contentment. Overcome problems. Correspondence courses only. Write for FREE book telling how.

**THE NEOTARIAN FELLOWSHIP**

Desk 5, Pickwick Building

Kansas City 6, Missouri

**I'll Send You This Handsome  
SAMPLE CASE—FREE**



and Show You How to Make  
Up to \$30.00 in a Day

WRITE for this FREE Tailoring Sample Case packed with 100 beautiful, big-value suit and overcoat fabrics. Take orders from friends, fellow-workers, others, for fine quality, made-to-measure clothes. Pocket big cash profits in advance. Because wearing our suits and overcoats brings more orders, we make it easy for you to get your own clothes without the cost. No experience is needed. **SATISFACTION GUARANTEED.** SEND NO MONEY. Rush your name, address, and age—today! **J. C. FIELD & SON, INC., Harrison & Throop Sts. DEPT. B-172J CHICAGO 7, ILLINOIS**

**AVIATION CAREER**

**SPECIALIZED EDUCATION / PROFESSIONAL  
TRAINING... only 16 months to 2 years**

Top-pay prestige positions, bright future in aviation. Job opportunities waiting for you as soon as you're ready. Airframe and Powerplant Technician, Aeronautical Engineering Technologist, Business or Executive Pilot. Classes in Miami.

**SEND FOR FREE 48-PAGE BOOK**

Embry-Riddle Aeronautical Institute  
Dept. S Miami, Florida (Founded 1926)

Name.....

Address.....

City.....Zone.....State.....



Sworn statement from CHAS. LEMMING reads:

**"After starting  
my own business**



I've averaged **\$100** A DAY  
—most of it clear profit!"

Not everyone does as well...Mr. Lemming owns two machines

• In city of less than 50,000, Mr. Lemming started his own business after filling in coupon like one below. He averaged \$100 a day during first year, some days \$200. F. E. Doran grossed \$1050 in single month. Geo. Held grossed \$300 in one week.

How much you earn depends largely on you. No special skill, no large investment required for our electric upholstery cleaning machine. Start spare time until full time justified. Hire helpers as needed.

**NO SHOP NECESSARY** • You clean upholstered furniture on customers' premises—homes, hotels, motels, etc. Auto upholstery, too. No hauling; operate from your home. Watch business grow as satisfied customers tell friends. Supplies cost little, profits high.

If you want to be independent—free from layoffs, bosses—start profitable, year 'round business of your own. Ours is not a lease proposition. You own the machine, you work when and where you please, and all the money you take in is your own.

**FREE** book tells exactly how to do it.

MAIL COUPON TODAY FOR FREE BOOK

**VON SCHRADER MFG. CO.**

211 "D" Pl., Racine, Wisconsin

Without obligation rush your **FREE** booklet about how I can start my own permanent, profitable electric Upholstery Cleaning business.

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

**on any object ELECTROPLATE**  
ANY OBJECT IN HOME SHOP GARAGE

NOW with our NEW **ELECTROCHEMICAL** outfit. You can easily do your own plating with same **LUSTER** and **DURABILITY** as by more expensive equip. Outfit comes complete ready to start plating immediately. With instructions on plating metal & non-metal objects as Tools, Auto Parts, Silverware, Jewelry, Baby Shoes & 1001 other articles with **CHROME, NICKEL, COPPER, GOLD, etc. SEND NO MONEY.** Everything sent C.O.D. for the low price of **ONLY \$5.95** or send \$5.95 now and receive it postpaid. Money back in 7 days if not satisfied. M.Z. Sales Co., Dept. H-31, 113 W. 42nd St., N.Y. 36, N.Y.

**MASS PRODUCTION MAKES THESE PRICES POSSIBLE**  
**EASY TERMS**  
**SEND FOR FREE COLOR CATALOG**

**16 FT. RUNABOUT KIT**  
Complete with accessory package, low as \$17.57 per mo.

**TAFT MARINE WOODCRAFT**  
Dept. PS-260 636 39th Ave. N.E., Minneapolis 21, Minn.

## FLY YOUR OWN Bensen HELICOPTER

Simple to fly — build it yourself, with engine or as inexpensive glider type. Safer than planes—women fly and like it too. Order 3-view drawing, specs and photo of Glider for \$1 or motor powered Gyro-Copter \$2.



Building plans and kits also available—

**BENSEN AIRCRAFT CORP., Dept. PS-20**  
Raleigh-Durham Airport, N. C.

Send  
\$1 or  
\$2

Name \_\_\_\_\_  
Address \_\_\_\_\_

## ENGINEERING



Photo of Heald Students  
in Electrical Laboratory

**Enroll Now for New Term**

Heald College Ranks **FIRST**  
West of the Mississippi  
in "Who's Who in America"

Send for **FREE** Information

**Heald Engineering College**

Est. 1863

Van Ness at Post, Dept. PS-260  
San Francisco, California

NAME \_\_\_\_\_  
STREET \_\_\_\_\_  
CITY \_\_\_\_\_  
STATE \_\_\_\_\_

**Heald Trained Engineers  
are Moving Ahead and  
Winning High Positions  
Throughout American  
Business and Industry.**

**BACHELOR OF  
SCIENCE DEGREE,  
30 MONTHS**

**SAVE 2 YEARS' TIME**

**Degree Courses:**

- ☐ Electronic Engineering
- ☐ Electrical Engineering
- ☐ Highway Engineering
- ☐ Mechanical Engineering
- ☐ Structural Engineering
- ☐ Civil Engineering
- ☐ Architecture

**Diploma Courses:**

- ☐ **TELEVISION** ☐ Color TV
- ☐ Electronic Technician
- ☐ Industrial Electronic Tech.
- ☐ Tool & Die Design
- ☐ Architectural Drafting
- ☐ Mechanical Drafting
- ☐ Structural Drafting

**Approved for Veterans**





**EARN BIG MONEY...**

**LEARN AT HOME IN SPARE TIME**

You don't need previous training or art ability with the "Famous System of Manual Training!" With this modern streamlined method, you learn rapidly and easily...start to cartoon immediately, without tedious study or exercises.

Wide Demand for Cartoonists—Earn While You Learn...Magazines, newspapers, movies, television, ad agencies—all are searching for new cartoon ideas and talent. As a successful, Continental-trained Cartoonist, your earnings are not limited.

Many of our students start earning after first few lessons. A wonderful pastime, too.

We Supply Everything...As our student, you receive FREE of extra cost a big 15-piece Professional Kit containing all equipment and materials you need, and valuable Articulated Model that helps you draw any human pose.

Get All the Facts FREE...Big, colorful Free catalog gives all details plus pages of useful information. FREE for the asking. Use coupon.

\*U.S. Pat. Applied For



SEND  
COUPON FOR  
FREE BOOK

**Continental Schools, Inc.**  
4201 S. BROADWAY, LOS ANGELES 37, CALIF.

Continental Schools, Inc.  
Dept. B-2, 4201 S. Broadway, Los Angeles 37, Calif.  
Please rush me your Free Catalog and other information by return mail. No charge or obligation, no salesman will call.

NAME \_\_\_\_\_  
ADDRESS \_\_\_\_\_  
CITY \_\_\_\_\_ ZONE \_\_\_\_\_ STATE \_\_\_\_\_

**FOR  
INDUSTRY  
OR  
HOME-CRAFT  
8" TILT  
ARBOR SAW  
BUY DIRECT  
FROM FACTORY**

COMPLETE AS  
SHOWN—LESS BLADE

**NOW  
\$14.85  
WAS \$29.95**

**5/8" NEW DEPARTURE  
BALL BEARING SPINDLE  
PRECISION GROUND CAST IRON TABLE**

Ideal for light factory work — excellent for the home workshop — that's the new Model 590B 8" TILT ARBOR SAW. Over 300,000 sold already! Does everything same as saws costing 4 times as much — cross cuts, rips, bevels, mitres, dados, cuts compound angles. Adjustable depth of cut: 0" to 2 1/2". Blade tilts to 45°. Heavy duty all cast iron and steel construction. Precision ground cast iron table. Sealed NEW DEPARTURE ball bearings never need lubrication. Price includes massive cast iron mitre gauge and patented motor drive that fits any motor. All parts and labor guaranteed 10 years.

**SPECIAL BARGAIN...** This saw is our 1959 Model — brand new — shipped in factory sealed cartons. Sold and guaranteed from factory to you at fantastically low price.

**MONEY BACK GUARANTEE...** This saw and parts are guaranteed 10 years! Try it for 10 days. If not completely delighted — FOR ANY REASON — return for immediate refund. Order Model 590B. SENT EXPRESS COLLECT—Send check or M.O. \$3.00 deposits on C.O.D.'s • Open account to rated firms

**AMERICAN MACHINE & TOOL CO.**  
ROYERSFORD 13, PA.

Our 30th Year Manufacturing Quality Power Tools  
Pennsylvania residents add 4% sales tax

**GET STARTED IN YOUR OWN  
MAIL ORDER BUSINESS  
FROM YOUR OWN HOME**

**NO INVESTMENT IN MERCHANDISE  
NO EXPERIENCE NEEDED**

Without obligation, we show you how you can get into the fabulous MAIL ORDER BUSINESS...without investing one cent in merchandise. You need no experience because we show you every step of the way. You start in your spare time from your own home. We help beginners get started. You work when you feel like it. You're your own boss. The mailman brings you the orders and you pocket the profits in advance...We supply you with everything you need...mail order folders, lists of mail order buyers, etc...we ship for you. Rush your name and address today for the most wonderful chance of a lifetime. We send you all the details FREE

**NATIONAL MAIL MERCHANDISERS** Dept. PS-2  
618 Washington St. • Boston 24, Mass.

**SHORTHAND** IN

Famous SPEEDWRITING shorthand, 120 words per minute. No symbols: no machines: uses ABC's. Learn at home or through classroom instruction. Low cost. 500,000 graduates. For business and Civil Service. Typing available. 37th Year. Schools in over 400 cities. Write for FREE booklet.

**Speedwriting**  
Dept. 2602  
55 W. 42 St., N.Y. 36, N.Y.

**6  
WEEKS**

**ASTRONOMICAL REFLECTOR  
TELESCOPE PARTS!**

BIG NEW  
64 PAGE  
CATALOG  
50¢  
(refundable  
on  
first order,  
\$5 or more)



Before you buy telescopes...Know telescopes! Our BIG 64 page catalog shows you every part and accessory imaginable including mirror kits, our famous line of complete TRECKER telescopes, various models of refractor telescopes...also microscopes, riflescopes, spotting scopes, etc. Largest selection of books on Astronomy. Interesting and informative, explains what's really important...POWER or RESOLUTION in your telescope! Don't delay, send 50¢ now for this information-packed catalog from the nation's foremost telescope manufacturer. Est. 1933.

**COAST INSTRUMENT, INC.**

Dept. F, 4811 Long Beach Blvd., Long Beach 5, Calif.

Dealers inquire

**REAL ESTATE  
BE A BROKER**

PAY BIG! SEND FOR FREE, BIG, ILLUSTRATED CATALOG NOW! Graduates report making substantial incomes. Start and run your own business quickly. Men, women of all ages, learn easily. Course covers Sales, Property Management, Appraising, Loans, Mortgages, and related subjects. **STUDY AT HOME** or in classrooms in leading cities. Diploma awarded. Write TODAY for free book! No obligation.

Approved for World War II and Korean Veterans  
**WEAVER SCHOOL OF REAL ESTATE (Est. 1936)**  
20205 Grand Ave. Kansas City, Mo.

**FREE  
BOOK  
TELLS  
HOW**

**THEY'RE FUN  
TO BUILD!**

**ADULT HOBBY  
MODELS**



Robert E. Lee  
Authentic model of the  
famous Mississippi River  
steamboat. Over 360  
perfect scale parts in colors \$7.95



See the complete line of PYRO Hobby Models...priced from 79¢ to \$7.95...at better hobby dealers.

Send 10¢ for our big new 1960 catalog with FREE Bonus Coupons worth as much as \$3.85 (10¢ to 80¢ off on many Pyro models).

**PYRO PLASTICS CORPORATION**  
16 PYRO PARK • UNION, NEW JERSEY



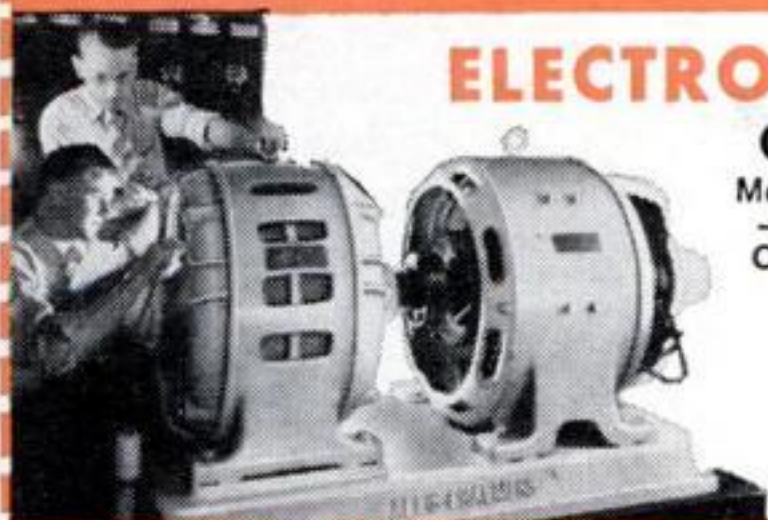
These men are getting practical training in **NEW Shop-Labs of**

# ELECTRICITY

## ELECTRONICS

### ON REAL

Motors—Generators  
—Switchboards—  
Controls—Modern  
Appliances—  
Automatic  
Electronic  
Control Units



# TELEVISION

## RADIO ELECTRONICS

### ON REAL

TV Receivers—  
Black and White  
and Color  
AM-FM and  
Auto Radios  
Transistors  
Printed Circuits  
Test Equipment



# COYNE

in Chicago—prepare for today's TOP OPPORTUNITY FIELD. Train on real full-size equipment at COYNE where thousands of successful men have trained for over 60 years—largest, oldest, best equipped school of its kind. Professional and experienced instructors show you how, then do practical jobs yourself. No previous experience or advanced education needed. Employment Service to Graduates.

**START NOW—PAY LATER**—Liberal Finance and Payment Plans. Part-time employment help for students. **GET FREE BOOK**—"Guide to Careers" which describes all training offered in **ELECTRICITY** and **TELEVISION-RADIO ELECTRONICS**—no obligation; NO SALESMAN WILL CALL.

Coyne Electrical School, 1501 W. Congress Parkway  
Chartered Not For Profit • Chicago 7, Dept. 2d-4C

## MAIL COUPON OR WRITE TO ADDRESS BELOW

**COYNE ELECTRICAL SCHOOL**  
Dept. 20-4C—New Coyne Building  
1501 W. Congress Pkwy., Chicago 7, Ill.

Send BIG FREE book and details of all the training you offer. However, I am especially interested in:

☐ Electricity ☐ Television ☐ Both Fields

Name.....

Address.....

City..... State.....



## cabana marrone



PLAN YOUR FUTURE NOW...  
have a business of your own

Luxurious, high-fashion fur now being ranch-raised in U.S.A. and Canada. All select, pedigreed, registered stock. Easy and economical to raise in any climate. One pair should produce 10 to 15 young per year. Warranty assures life and production. You may qualify for membership in CNBA (Cabana Nutria Breeders Association), the largest and strongest Nutria association. Free ranch training program. Cabana Marrone Nutria garments nationally advertised.

Cabana Marrone available only through authorized distributors. Write for complete information. Distributor inquiries invited.



**CABANA NUTRIA INC.**  
Dept. 73 636 West Lemon Arcadia, Calif.

## High School at Home

### MANY FINISH IN 2 YEARS

No classes. No time wasted going to and from school. Progress as fast as your time and abilities permit. Standard H. S. texts supplied. Thousands enroll each year in this 63-year-old school. Send for FREE descriptive booklet.

**AMERICAN SCHOOL, Dept. H246**  
Drexel at 58th St., Chicago 37, Ill.

Without obligation, please send FREE descriptive booklet.

Name.....

Address.....

Accredited Member National Home Study Council

## Exotic waterfall

These enchanting water fountains beautify any garden, home, or office. A real showpiece—portable for indoor or outdoor use! A complete unit—may be moved easily. No plumbing necessary. Simply plug in the powerful electric water pump. Circulates the same water over and over. Heavy duty construction. Will give years and years of silent service. This is the type fountain featured in all home magazines. Comes in Arctic White, Aqua Blue-green, and Iron Black. Handsome contoured bowls 16", 18", and 21". Sturdy frame is adjustable to fit any decor. A gift to be cherished for many years. Satisfaction guaranteed. Send \$29.95 plus \$3 freight.

**EXTRA LARGE \$39.95**

Four-tier fountain with 16", 18", 21" and 26" bowls, only \$39.95 plus \$3 freight. Satisfaction guaranteed.

**S & R RESEARCH, DEPT. PO, 845 E. EL MONTE, SAN GABRIEL, CALIF.**

**DON'T PAY \$100 - BUY DIRECT!**

**SPECIAL FACTORY OFFER!**



**\$29.95**

patio, garden



offices, foyers



Will You Trade 1 Hour a Week  
for BIG PAY—YOUR OWN BUSINESS?



## Be a LOCKSMITH

You can quickly step into a well-paid job or start a big-profit business of your own. Shortage of locksmiths means opportunities everywhere, spare-time or full-time.

**EARN EXTRA MONEY FROM THE START!**  
All Special Tools, Supplies Furnished Free

Age, education, minor physical handicaps don't matter in this growing, steady-income trade. You learn fast at home—gain practical experience through well-illustrated lessons. You do real jobs under the personal guidance of experts. Only school of its kind.

For a future as your own boss, or in a big pay job, send for FREE illustrated book. Licensed State of N. J.; Accredited National Home Study Council. Mail coupon at once. No salesman will call.

Approved for Veterans.

**Locksmithing Institute**  
Dept. 202-B, 148 Park Ave.  
E. Rutherford, N. J.

Please send FREE and without obligation illustrated book.

Name .....

Address .....

City ..... Zone ..... State .....

**SEND FOR  
FREE  
BOOK  
Professional  
Tools  
FREE  
with Course**



## LEARN PLASTICS FABRICATION AT HOME!

**Complete  
Low-Cost  
Home Training  
Course NOW  
Available**

There's exciting opportunities for you in Plastics Fabrication. Fun and relaxation as a hobby! Big money as a spare or full-time business! Course teaches fibreglassing, model building and how to make molded, cast, internally carved colored plastic jewelry, toys, furniture, novelties, signs. Professionally prepared. Used by Industrial Arts Teachers. All materials furnished. For men and women.

Accredited Member National Home Study Council

**SEND FOR FREE BOOKLET**



**INTERSTATE TRAINING SERVICE**  
Dept. C-2, Portland 12, Oregon

Send Free Booklet on Plastics Home Training Course.

Name .....

Address .....

City ..... Zone ..... State .....



**BIG  
PROFITS—  
NO  
RISK!**

**LET SOLAR  
TWO-2-YEAR  
LIGHT BULBS**

**MAKE YOU \$10-\$70  
A DAY**

Supply trouble-free, SOLAR TWO-2-YEAR BULBS to factories, offices, homes. **GUARANTEED** in writing to burn 2 full years — last 4½ times longer than ordinary bulbs. Customers save 52¢ or more on every bulb. Send \$1.98 for 8 sample bulbs worth \$3.96 (money back if not satisfied). Or write for free facts.

**SOLAR ELECTRIC PRODUCTS, INC.**  
Dept. PS-20, 366 5th Ave., N. Y. 1, N. Y.

## You Can Have a HE-MAN VOICE

Send today for FREE booklet "Voice Power and Personal Power" by Eugene Feuchtinger. Just send your name, address and age. Mailed in plain sealed envelope. No obligation.

**PREFECT VOICE INSTITUTE**

210 S. Clinton St., Studio BP-1, Chicago 6, Ill.



**\$3.25 or 2 FOR \$6.00!**

With 40 ft. of wire. Additional wire 3¢ a ft.

**TESTED AND GUARANTEED**

Write for free list of all types of telephones. Shipments F.O.B. Simpson, Pa.

**TELEPHONE ENGINEERING CO.**  
Dept. 2AO Simpson, Pa.

• FOR HANDS • FOR FLOORS • FOR WALLS

# QUICKEE®

**SPECIALIZED CLEANERS**

Send for FREE HAND CLEANER SAMPLE. Dept. PS  
At Stores Everywhere / Quicke Products, Inc., Yonkers, N. Y.

## SUB-MACHINE GUN

**FULL SIZE MODEL**

- Magazine loading clip.
- 15 moving parts.
- Fires 10 rounds automatically.

**\$6.95**

Freight prepaid  
Not available  
to residents  
of New Jersey

**.30 caliber  
pellet firing automatic**

Automatic full size model of famous sub-machine gun. Beautiful gun with complete take-down action. A real collectors piece. Crafted in styrene like famous guns used by troops, law enforcement agencies. Over 28 inches in length. Fires as fast as you can pull the trigger. Loads 10 complete rounds in magazine clip which snaps into frame. Comes with complete instructions on operation and maintenance plus full supply of .30 caliber pellets. Satisfaction guaranteed. Send \$6.95 to:  
**WHOLESALE IMPORT CO., Box C-20, San Gabriel, Calif.**





# It's EASY to be TALLER

## Why be Average?

Now you can be dramatically taller...it's just as easy as stepping into a pair of "ELEVATORS"! These amazing shoes instantly add that all-important height you need to make you a BIG man... give you the boost you need to command the respect of everyone! And it's your secret because smartly-styled "ELEVATORS" look and feel just like other fine shoes! TODAY... send for FREE BOOKLET illustrating 34 styles for street, sport and dress.

Brockton Footwear, Inc., Dept.  
5-20 Brockton 68, Mass.



# DOES GETTING UP NIGHTS MAKE YOU FEEL OLD?

NEW YORK—Special: Thanks to new, scientific laboratory formulation, thousands of men and women now escape feeling old, tired, irritable and depressed from losing sleep and worrying about "Bladder Weakness"—too frequent, burning and itching urination, Bed Wetting, Getting Up Nights—or Strong Cloudy Urine, due to common Kidney or Bladder Irritations, which often result in secondary Backache, Headache and Nervousness. In such cases New Improved CYSTEX usually gives quick, calming relief by combating irritating germs in acid urine; and by relaxing, analgesic pain relief. Safe for young or old. Get CYSTEX at druggist. Feel better fast or money back.

# Home Training in AUTO MECHANICS



includes  
**BIG TOOL OUTFIT**  
Testing Instruments

Be an AUTO MECHANIC—learn at Home in spare time. You get top-notch training. School chartered "not-for-profit." Est. 1898. Free Booklet tells about Employment and Consultation Services—plan for success in Own Business or Good Paying Job.

47 Piece Tool Kit Plus 3 Testing Instruments **FREE BOOKLET—MAIL TODAY**

**AMERICAN TECHNICAL SOCIETY, Dept. PS-20**  
850 East 58th St., Chicago 37, Ill.

Please send Free Booklet telling how I can train at Home to be an Auto Mechanic.

Name ..... Age .....

Address .....

City ..... State .....

Accredited Member National Home Study Council

# FREE CAREER BOOKLET

## To guide you to a successful future in

# ELECTRONICS RADIO-TV COMPUTERS ELECTRICAL ENGINEERING

This interesting pictorial booklet tells you how you can prepare for a dynamic career as an Electrical Engineer or Engineering Technician in many exciting, growing fields:

- MISSILES • AVIONICS • AUTOMATION
- SALES • DEVELOPMENT
- ELECTRICAL POWER • ROCKETRY
- RADAR • RESEARCH

Get all the facts about job opportunities, length of study, courses offered, degrees you can earn, scholarships, part-time work—as well as pictures of the Milwaukee School of Engineering's educational and recreational facilities. No obligation—it's yours free.

# MILWAUKEE SCHOOL OF ENGINEERING

## MAIL COUPON TODAY!

**Milwaukee School of Engineering**  
Dept. PS-260, 1025 N. Milwaukee St., Milwaukee, Wis.

Please send FREE "Your Career" booklet I'm interested in

☐ Electronics ☐ Radio-TV ☐ Computers

☐ Electrical Engineering ☐ Mechanical Engineering

Name ..... Age .....

PLEASE PRINT

Address .....

City ..... Zone ..... State .....

☐ I'm eligible for veterans education benefits.  
Discharge date .....



ADVANCE IN THE PROFESSION  
WITH A FUTURE . . . LEARN

# DRAFTING

AT HOME . . EASILY . . IN SPARE TIME!



Complete  
Equipment FREE  
of extra  
cost!

HERE IS YOUR CHANCE! Become a key man in space age progress. Never before has there been such a demand and respect for trained draftsmen. Draftsmen get top pay, are in line for promotion to executive positions. NO EXPERIENCE NEEDED! C.E.I.'s modern drafting courses are the finest, practical, most thorough home study training available! C.E.I.'s licensed engineers and architects guide you each step of the way. Find out how a C.E.I. diploma can open doors for you, bring you bigger pay . . . a better life, MAIL COUPON NOW!

## FREE LESSON & SUCCESS BOOK

Cleveland Engr. Inst., Dept. PS-2K  
6300 Euclid Ave., Cleveland 3, Ohio

☐ Architectural ☐ Mechanical  
☐ Aeronautical

MY NAME . . . . . AGE . . . . .

ADDRESS . . . . .

CITY . . . . . STATE . . . . .

NO OBLIGATION—NO SALESMAN

VETERAN APPROVED A-2476

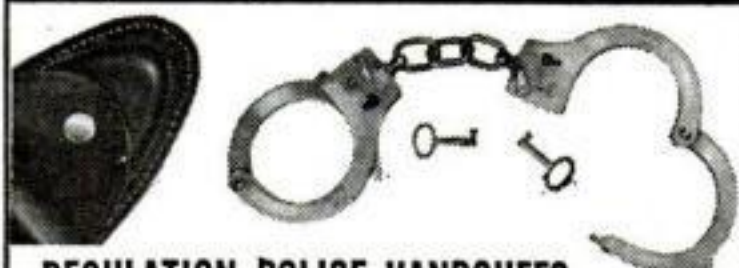
CLEVELAND ENGINEERING INSTITUTE



## OFFICIAL SPREAD EAGLE SHIELDS Silver or Gold

Finest quality with reinforced backs and pins for heavy duty. A quick flash of one of these gleaming, official-looking badges instantly shows who has the power! Your choice: Special Officer, Deputy Sheriff, Constable, Watchman, Sheriff, Police, Special Police, Private Detective, Civilian Defense, Special Investigator. Standard Size: \$1.98. Miniature: \$1.25.

SPECIAL OFFER! FREE! — Authentic Badge Carrying Case FREE with each badge.



## REGULATION POLICE HANDCUFFS

With New, Exclusive CUFF-STOP \$5.95

Latest type—features exclusive Cuff-Stop that locks handcuffs automatically. Made of hard-tempered steel with jewelry polished nickel surface. Fitted with 2 tamper-proof locks that only matching key will open. Used internationally by Law Enforcement and Private Detective Agencies. \$5.95. Deluxe Leather Cuff Case: \$2.75.

All prices postpaid. SATISFACTION GUARANTEED. Send cash, check or money order and save C.O.D. charges. \$1.00 deposit with all C.O.D. orders.

BIG THREE ENT., INC.

1109 Sixth Ave., N. Y. 36, N. Y.  
Dept. PS260

# Shrinks Hemorrhoids New Way Without Surgery Stops Itch—Relieves Pain

For the first time science has found a new healing substance with the astonishing ability to shrink hemorrhoids and to relieve pain—without surgery.

In case after case, while gently relieving pain, actual reduction (shrinkage) took place.

Most amazing of all—results were so thorough that sufferers made astonishing statements like "Piles have ceased to be a problem!"

The secret is a new healing substance (Bio-Dyne\*)—discovery of a world-famous research institute.

This substance is now available in suppository or ointment form under the name Preparation H.\* Ask for it at all drug counters—money back guarantee.

\*Reg. U.S. Pat. Off.

## GET INTO ELECTRONICS

V.T.I. training leads to success as technicians, field engineers, specialists in communications, guided missiles, computers, radar, automation. Basic & advanced courses in theory & laboratory. Assoc. degree in 20 mos. B.S. obtainable. ECPD accredited. G.I. approved. Graduates with major companies. Start Sept., Feb. Dorms, campus. H.S. graduate or equivalent. Catalog.

VALPARAISO TECHNICAL INSTITUTE  
DEPT. S VALPARAISO, INDIANA

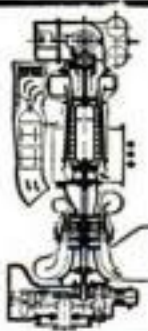
## RUPTURED?

TEST THIS TRUSS FREE FOR 30 DAYS



Wear a Web—for comfortable, guaranteed relief! If not satisfied after trial, full purchase price refunded. Write today for free book on rupture care.

WEB TRUSS Co. Dept. PS-2, Hagerstown, Md.



## GAS TURBINE

### THE ENGINE OF THE FUTURE

Study gas turbine design and operation—all phases including types, efficiencies, impulse and reaction blading. The engine with complete simplicity and compactness. Over 72 8 1/2 by 11 pages of excerpts about the application to automotive, aeronautical, railroad, marine and industrial engineering and light yacht propulsion. Fully illustrated with photos and drawings and basic technical data. Learn about and prepare yourself for the engine of the future because of its lightness, smooth operation and high speed. Send \$2.00 to

W. TURNER, 44 West 63rd Street, New York 23, N. Y.  
No C.O.D.'s. Money back guarantee.



My pupils—from 11 to 87—prove  
**YOU CAN HAVE A NEW  
BODY AT ANY AGE . . .**

with New Health—New Strength!  
Now—at last—you can quickly and easily GAIN pounds of solid muscle—or REDUCE unsightly, dangerous fat. Build a SUPER-PHYSIQUE, with POWERFUL, shapely muscles—OR—just keep fit and healthy . . . in top condition.

Billy Van says: **"ALL YOU NEED IS A ROPE!"**

My amazing scientific discovery, ROPERCISE, Guarantees Results in a few minutes 3 DAYS A WEEK! Write NOW for FREE booklet.

BILLY VAN—PHYSICAL DIRECTOR

4834 Art St. Studio 2 San Diego 15, California



**EARN \$125  
A WEEK AND UP**

**BE AN AUTO-DIESEL  
EXPERT — LEARN  
A TRADE YOU LIKE**

You learn fast in our shops because you learn with tools on real equipment. Students short of money may earn most of their expenses by doing part-time work. Experienced instructors explain WHY and show you HOW, then you DO IT YOURSELF. Forty years' experience training men. Successful graduates in 50 states and many foreign countries. Many of our graduates earn \$125 a week and up. Approved for veterans. Day and evening classes. Free bulletin-write today.  
**NASHVILLE AUTO-DIESEL COLLEGE**  
226 7th Ave., No., Dept. 42, Nashville, Tenn.

**START YOUR OWN  
MAIL ORDER  
HOME BUSINESS**

**FREE  
Publication  
SHOWS  
YOU  
HOW**

Get your FREE COPY of "How to Make Money in Mail Order" revealing plans on how and where to get best products to sell by mail, how to pocket profits in advance, how to get free ads. Men, women, families, start your own big profit home mail order business without experience or product investment. New Mail Order Exchange Plan helps beginners start. Confidential bulletins show you products to sell by mail, show newest sure-fire mail order techniques. Write today for your Free

Copy of "How to Make Money in Mail Order." There's no obligation. Airmail reaches us overnight. **MAIL ORDER EXCHANGE,**  
1717 Westwood, Dept. C-242 Los Angeles 24, California

**NOW**

VOLKSWAGEN  
RENAULT  
ENGLISH FORD  
METROPOLITAN  
and many others.

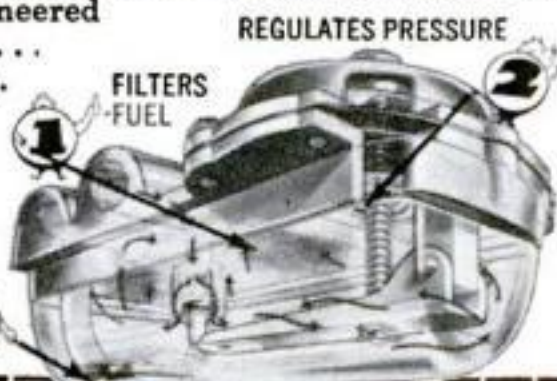
**FOR EUROPEAN CARS**

**+ SPECIAL**

**MILESMaster® 1.5**

Enjoy all the famous regulation and filtration action features of MilesMaster—the genuine Fuel Pressure Regulator... Now, specially engineered for European engines... no increase in price... provides smooth throttle through gears. Stops stalling, flooding, vapor lock and rough idling.

TRAPS METALLIC  
ABRASIVES



Take this coupon to your dealer—  
if he can't supply send order to...

**MILESMaster, INC., Dept. 106,**  
1550 E. 74th Place, Chicago 19, Ill.

**MONEY \$6.95  
BACK  
GUARANTEE**  
complete with  
fittings

*America's finest*

**BOLENS**

*outdoor*

**BOLENS**

*power equipment*

**BOLENS**



**RIDEMASTER —**  
5½ hp, 36" cut

RIDE YOUR WAY through lawn care with the big, new Bolens Ridemaster. Here's an easy-handling mower with proven power for slopes and terraces. Trims within a half-inch of obstacles. Automotive steering and differential, 6-speed variable Versa-Matic drive, 12 lever-adjusted cutting heights, maximum blade speeds at all times. Seven attachments for year 'round use. Demonstration proves it . . . ask for one!



Also available in 4½ hp,  
26" cut Greenbrier and  
3½ hp, 24" cut Suburban.

**BOLENS**

Use this coupon to get free full-color literature,  
name of your local Bolens dealer.

Check catalogs you want, mail coupon with your  
name and address.

- |  |   |
|--|---|
| <input type="checkbox"/> Riding & Walking Mowers | <input type="checkbox"/> New FMC Orbit-Air Mowers |
| <input type="checkbox"/> Utility Tractors        | <input type="checkbox"/> "Convertibles"           |
| <input type="checkbox"/> Rotary Tillers          | <input type="checkbox"/> Chain Saws               |

**BOLENS PRODUCTS DIVISION**

Food Machinery & Chemical Corporation  
Dept. D-5, Port Washington, Wisconsin



# FREE! LAFAYETTE'S 1960 CATALOG



304 GIANT-SIZED PAGES

CONTAINS

HUNDREDS OF EXCLUSIVE LAFAYETTE ITEMS NOT IN ANY OTHER CATALOG OR AVAILABLE FROM ANY OTHER SOURCE - SEND FOR YOUR COPY NOW!

See the newest and finest in Stereo Tuners, Amplifiers, Cartridges and Music Systems

• TAPE RECORDERS • PUBLIC ADDRESS SYSTEMS • AMATEUR EQUIPMENT • INDUSTRIAL SUPPLIES • RADIO & TV TUBES AND PARTS • INSTRUMENTS • TELESCOPES, BINOCULARS, MICROSCOPES & CAMERAS

Everything In Electronics

The Complete Catalog Featuring The Best Values Obtainable

LEADERS IN HI-FI

OUR

39th

YEAR

The most complete electronic supply catalog crammed full of everything electronic at our customary down-to-earth money-saving prices.

The largest selection of hi-fi components and systems; greatest savings on Lafayette endorsed "best-buy" complete systems.

EASY PAY TERMS AVAILABLE — 10% DOWN — UP TO 18 MONTHS TO PAY

*Lafayette Radio*

P.O. BOX 222  
JAMAICA 31, N. Y.  
DEPT. KB-1

☐ Send FREE LAFAYETTE Catalog 600

Name.....

Address.....

City..... Zone..... State.....

CUT OUT  
AND PASTE  
ON POST  
CARD

## Free! SCARCE TRIANGLE COLLECTION



Start TODAY to enjoy an exciting new hobby! Get this big, valuable collection of gorgeous, multi-colored triangle shaped postage stamps... brought to you from strange and mysterious lands in the wilds of Africa, enchanting Europe, exotic Latin America, etc. All genuine, all different—picturing man-eating reptiles, jungle birds, action-packed sports, ancient clipper ships; PLUS scarce airmails, fabulous commemoratives, giant and midget-sized stamps. EXTRA! Bargain Catalog, "Collector's Manual" plus other exciting offers for your inspection. Enclose 10c for mailing costs. Supplies limited. ACT NOW!

JAMESTOWN STAMP CO. DEPT. H2OPS JAMESTOWN, N.Y.

RUSH my Free "Triangle" Collection and other offers. I enclose 10c for mailing costs.

Name.....

Address.....

City & State.....



## EMPLOYED MEN! HERE'S YOUR 'SECOND' INCOME!

Tar-tan Grain with Air Cushion & Arch Support



SELL "ALL-DAY COMFORT" SHOES IN SPARE TIME

Add \$40 a week to your income. Have extra cash for yourself and your family. Take orders from friends for remarkable values in work, dress, casual shoes and finest lightweight boots. 180 styles for men, women, children. Make up to \$5.00 a pair commission plus bonus. Get your own shoes at no cost as an "extra"! No experience, no investment. Samples supplied. Miracle value \$8.95 and \$9.95 men's dress and sport shoes add to your income. Write today for FREE Selling Outfit. CHARLES CHESTER SHOE CO., Dept. B-019, Brockton, Mass.

DAN LURIE AMERICA'S CHAMPION MUSCLE BUILDER



## BUILD YOUR MUSCLES FAST WITH DAN LURIE BARBELLS

Get results as no other method can. See as low as your arms, chest, legs grow like magic. No other method compares. Get \$10.00 BODY MOLD COURSE FREE with order. Results guaranteed. Buy direct and save.  
50 lb. set .. \$9.48 • 150 lb. set .. \$23.48  
100 lb. set .. \$15.98 • 200 lb. set .. \$29.98  
Semi-steel sets approx. 10% higher. Extra wts. 15c per lb. Send 50% cash bal., COD.. F.O.B. Plant. Order today.  
DAN LURIE BARBELL CO., Dept. 70-B, 52-S-2 Bristol St., Bklyn. 12, N. Y.

## EXCLUSIVE DOUBLE-BEARING HEAVY DUTY PUMPS



IRRIGATE • DRAIN • CIRCULATE • SPRAY  
Use 1/4 HP motor or larger... 1 HP for up to 7,500 GPH; 1,000 GPH 60' high; or 3,000 GPH from 25' well. 1 1/4" inlet; 1" outlet. Stainless shaft. TYPE X—2 oil-less bronze bearings. Won't rust..... \$10.95  
TYPE XB—Ball bearing model. \$12.95  
Best for belt drives.....  
Postpaid if cash with order.  
Don't delay—send for yours today!  
MONEY BACK GUARANTEE  
Centrifugal and Gear Pumps in All Sizes  
LABAWCO PUMPS, Belle Mead 4, N. J.



## I SOLD A MILLION STARS (Verifiable)

EVER HAVE AN IDEA? Ours came out of the night sky and into national volume sales. NOW—you idea men and women, inventors, mail order people. I'll tell you how you too can get into the volume field. I'll reveal to you the know-how, how to create an idea, protect, promote it, make money for yourself. I've a FAT package of priceless information at LOW cost; testing lists, names of top volume users, vital facts, many sound tips. Lets start some action. Write for details. I'll give you a hand-up. STEPHEN WALSH, 1972 Fullerton Avenue, Costa Mesa 4, California. Refs. Dun & Bradstreet; Bank of America.

## PROTECT YOURSELF

with this Fountain Pen-Type POCKET

## TEAR GAS

DEVICE... \$15 VALUE 38 Special Cal.

\$5.95 with 1 shell Additional shells 50c ea.

For police or civilian defense against robbers, mashers, etc. Causes no permanent injury. Highly polished heavy nickel case with spring-steel pocket clip.

SEND CHECK OR MONEY ORDER. NO COD'S



Nickel Plated Peerless Type  
**HANDCUFFS**  
\$15.00 value SPECIAL 7.95 pr.

Registered Colt Distributors  
Suppliers for  
Official Police Equipment

PUBLIC SPORTS SHOPS, DEPT. P-1 11 S. 16th St., Phila. 2, Pa.



# Draw Lincoln

## YOU MAY WIN A \$430.00 SCHOLARSHIP IN COMMERCIAL ART

Winner gets a complete art course—free training for a money-making career in commercial art, illustrating or cartooning.

You are coached, individually, by professional artists on the staff of world's largest home study art school. Many successful artists have studied with this school, founded forty-five years ago. It's an accredited member of the National Home Study Council. Contest winner also gets drawing supplies and illustrated art textbooks. Try for this free art course! Mail your drawing today.



**ART INSTRUCTION, INC., STUDIO 2140**  
500 South 4th Street, Minneapolis 15, Minn.

Please enter my drawing in your draw-a-head contest. (PLEASE PRINT)

Name \_\_\_\_\_ AGE \_\_\_\_\_

Address \_\_\_\_\_ Apt. \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ County \_\_\_\_\_

State \_\_\_\_\_ Occupation \_\_\_\_\_

### DRAW LINCOLN'S HEAD

any size other than this (bigger or smaller but not like a tracing). Use pencil. Drawings for March 1960 contest must be received by March 31. None returned. Winner notified. Amateurs only. Our students not eligible.

make it with 60c worth of sand & cement!

## SELL IT FOR \$2000

every home a prospect for these "LIFETIME"

## CONCRETE INCINERATORS

Make big profits manufacturing rust proof, fire proof, almost indestructible concrete incinerators in your own backyard or garage...full or part time. Sell to home-owners, hardware, department and garden supply stores. Phila. manufacturer doing big volume with Sears, Roebuck; large department stores. Easy to follow instructions and all needed equipment supplied. Exclusive protected franchise—No competition! Territories going fast. Write immediately for full details.



Dept. PS-260, T. C. TOR  
318 Rancocas Ave., Delanco, N.J.  
Gentlemen:

Rush full information about your concrete incinerator protected franchise offer.

Name \_\_\_\_\_

Street No. or R.D. \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

## TRAINED MEN NEEDED!

IN INDUSTRY—ARMED FORCES  
BIG PAY!—GOOD FUTURE!

☐ DIESEL ☐ ELECTRONICS  
☐ AUTO ☐ AUTOMATION

NEVER BEFORE has the opportunity been so good for the properly trained mechanic and technician to step into BIG PAY POSITIONS with rapid advancement and future security virtually assured.

YOUR SUCCESS depends on the quality of training you receive...and the reputation of the school you attend.

YOUR GUARANTEE we are giving the best in mechanical and technical training is proved by the fact... High pay jobs in Industry, and ratings in the Armed Forces now waiting for our graduates.

RESIDENT SHOP TRAINING is easier and costs less than you may think! We provide you with housing and part-time jobs while in school, plus free nation-wide placement service for graduates.

Check subject above in which you are interested and mail for

FREE BOOKLET

Your Future  
IN  
ELECTRONICS  
AND  
AUTOMATION

## BAILEY Technical Schools

Veteran Approved

1626 S. Grand, Rm. 50, St. Louis 4, Mo.

Your Future  
in...  
DIESEL and  
AUTO  
MECHANICS

Name \_\_\_\_\_ Age \_\_\_\_\_

Street \_\_\_\_\_

Town \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_



When you buy a

**LEE**

Resinweld\*  
Feridium\*  
Anode

**OIL FILTER**

..you get an extra\*  
filter for **FREE!!**



Just imagine getting 2 filters for the price of one! Why? Simply because every LEE OIL FILTER is actually \*two filters combined

- to give you: — 1. **ENGINE SLUDGE FILTRATION** — The accordion pleated element removes sludge and abrasives too tiny for the eye to see!  
2. **ENGINE ACID FILTRATION** — The built-in, patented Feridium\* Anode neutralizes and removes engine-eating acids!

If you want **TWICE AS MUCH** engine protection **AT NO EXTRA COST**, insist on getting a LEE Feridium\* Anode OIL FILTER! Sold wherever cars are serviced and in accessory stores.

\*T.M. Reg. U.S. Pat. Off. Pat. Pend.

LEE FILTER CORP., Dept. SD No. Arlington, N. J.

## LEARN TO OPERATE or REBUILD EARTH MOVING EQUIPMENT



Complete Mechanics Course covering Diesel engine transmissions; torque converters; fuel injection systems; track assemblies; final drive assemblies; steering systems; idlers; rollers; power transfer systems; cable control systems; hydraulic control cylinders & welding pertaining to heavy equipment such as bulldozers, scrapers, loaders, off-highway trucks, etc. Course time—540 hours—10 weeks to 13½ weeks. Convenient payment plan. Write for details. Approved for vets ☐ and civilians ☐

### OPERATORS COURSE

Learn to operate bulldozers, scrapers, motor scrapers, crawler tractors, draglines, off-highway dump trucks, etc., on 1,700 acre Greer Training Area 60 miles S.W. of Chicago, Ill. on route 66. Courses include operation, equipment care, preventive maint., stake reading, etc. Minimum classroom instruction. You learn by actually operating the equipment. 200 hour (5 week) complete course in the operation of bulldozers, loaders, scrapers, dump and off-highway trucks as low as \$375. Classes start every Monday. Reserve your space today. Approved for vets ☐ and civilians ☐



**Greer TECHNICAL INSTITUTE**

ATT: P. M. Hutch, Box 278, Braidwood, Ill.



The skilled hand of the German gunsmith is responsible for this .22 caliber, 6-shot repeater automatic with self-ejecting clip. Just 4" long, fits easily into pocket or purse. Ideal for sporting events, stage use. Excellent for training dogs. Not a lethal weapon. Money back guarantee.

(Not available to California residents.)

Comes for \$6.95 ppd. from

**BEST VALUES**

Dept. A-398, 403 Market, Newark, N.J.

Would YOU Like to Make  
**\$1,000 A MONTH?**

That's what Stanley Hyman  
made selling the amazing new  
**PRESTO Fire Extinguisher!**



Amazing new kind of fire extinguisher. Tiny "Presto" does job of bulky extinguishers that cost 4 times as much, are 8 times as heavy. Ends fires fast as 2 seconds. Fits in palm of hand. Never corrodes. Guaranteed for 20 years! Sells for only \$4.95! Over Two Million Sold!



STANLEY HYMAN

Show it to civil defense workers, owners of homes, cars, boats, farms, etc. and to stores for resale—make good income. H. J. Kerr reported \$20 a day. C. Kama, \$1,000 a month. Write for FREE Sales Kit. No obligation.

**MERLITE INDUSTRIES, Presto Div., Dept. P-16K**

114 East 32nd Street, New York 16, New York

IN CANADA: Mopa Co., Ltd., 371 Dowd Street, Montreal 1, P.Q.

50 POPULAR SCIENCE FEBRUARY 1960

**make your own Gems** **36.50**  
f.o.b.

The Gem Maker comes complete with all necessary equipment, including a super-charged diamond blade for sawing, and all the wheels for grinding, shaping and polishing; also complete instructions. The complete equipment as shown, less motor and belt for only \$36.50, f.o.b., Burlington, Wisconsin. Write today for information and literature.

**B&I MANUFACTURING CO.**  
Dept. S, Burlington, Wis.

**BIG EARNINGS WAITING  
for TYPEWRITER REPAIRMEN**

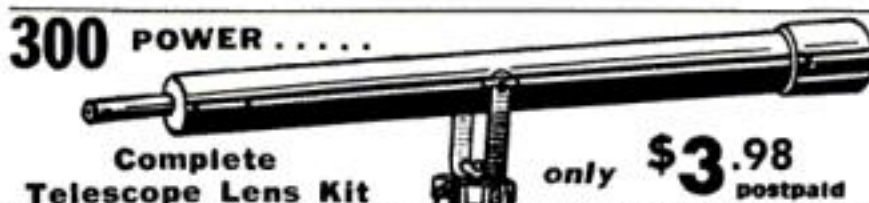
Skilled men are in demand in the new, uncrowded field of typewriter repair. You'll quickly step into a big-pay job or business of your own, full or part time. EARN while learning easily at home under expert guidance. Materials, tools, typewriter supplied.

Write TODAY for FREE book.

**TYPEWRITER REPAIR SCHOOL, INC.**  
Dept. B-20, 150 Park Ave., E. Rutherford, N. J.  
Lic. by New Jersey Dept. of Educ.

SEND FOR FREE BOOK  
Typewriter Supplied

**When Writing to Advertisers  
Please Mention Popular Science**



**300 POWER . . . .**

**Complete Telescope Lens Kit** **only \$3.98** postpaid

Conquer Space. Explore the Universe, planets, Moon Craters, New Stars, etc. Complete Lens Kit consists of 80 inch focal length ground and polished objective lens, eyepiece lenses for 50 POWER, 100 POWER, 150 POWER, 200 POWER, 250 POWER, 300 POWER, and all necessary lens fittings. Easy to make from simple step by step instructions. (Tripod and mount not included.) Money back guarantee.

**BUSSE SALES CO., Hartford, Conn., Dept. PS-83**



# SAVE UP TO 1/2 ON FINE ITALIAN CHORD ORGANS

Buy Direct-From-Importer... GET BIG DISCOUNTS

PLAY ON SIGHT! NO LESSONS NEEDED!

Here's the new musical instrument sensation that's suddenly captured the entire country! You and the children can play old and new songs in just a matter of minutes!... thanks to the famous DA-MAR System, included FREE! Makes music fun right from the start. Brings the whole family closer together as everyone joins in playing everything from hit tunes to lovely hymns. Best of all... you actually save 1/2 off mfr's list prices... buying direct from the importer. Pay only a small amount down... the rest just pennies a day!

**HAND CRAFTED IN ITALIAN TRADITION OF QUALITY**  
Most domestic-made Electric Chord Organs use inferior plastic reeds... but every Philharmonic reed is made of finest, carefully treated Swedish Stainless Steel for superbly richer tonal quality and volume. Your Philharmonic Electric Chord Organ is largely hand crafted, just as any outstanding instrument should be! A giant in performance—yet it's light in weight, fully portable. Choose from a wide selection of models, including Piano-Key-board model for those with piano background. **DOUBLE GUARANTEED.** Get new FREE Color Catalog and lowest Direct Importer-to-You Discount Prices. Rush Coupon...

PIANO-KEYBOARD MODELS ALSO AVAILABLE

## FREE BONUS GIFTS

- Big Solo Kit...with special easy-play arrangements of favorite songs.
- Plastic Protective Cover
- Expandable Music Portfolio
- Chemically Treated Polishing Cloth
- **DOUBLE GUARANTEE**...gives you 100% certified protection.

Rush coupon for details

## 5 DAY FREE HOME TRIAL

Try it—play it—enjoy it in your own home on 5-FULL DAYS' FREE TRIAL. Only then can you appreciate how much fun the Philharmonic can bring into your home. Details free.

**PHILHARMONIC ORGAN CORPORATION**  
Dept. P-20 2003 West Chicago Avenue, Chicago 22, Illinois



EASY TERMS  
SMALL DOWN PAYMENT  
BALANCE only  
PENNIES A DAY

24  
MODELS

**FREE! GET COLOR CATALOGS AND DIRECT IMPORTER-TO-YOU DISCOUNT PRICES**

Philharmonic Organ Corporation—Dept. P-20  
2003 W. Chicago Avenue, Chicago 22, Ill.

Rush Color Catalogs and Lowest Discount Prices

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ ZONE \_\_\_\_\_ STATE \_\_\_\_\_

Millions have done it so can YOU!

**Stop being SKINNY like I was**  
**Quickly GAIN 25 LBS. of**  
**HANDSOME, POWER-PACKED MUSCLES like I did**  
Send for these 5 AMAZING PICTURE COURSES  
All 5 FREE before \$1 price goes back

1. How to GAIN MIGHTY ARMS
2. How to GAIN A BIG CHEST
3. How to GAIN A MIGHTY BACK
4. How to GAIN POWERFUL LEGS
5. How to GAIN A GRIP OF STEEL

Send 10¢ for postage for all 6 items

Also FREE Photo Book of Strong Men

Jowett Institute, Dept. PS-02, 220 Fifth Avenue, N.Y. 1, N.Y.

**LEARN UPHOLSTERY**  
in your spare time  
run your own  
business  
**AT HOME**

FREE TOOLS WITH COURSE!

**FREE BOOK**  
with  
sample  
lessons

with course  
**YOU MAKE**



**PLUS**  
SLIP COVERS  
Yours to Keep  
or Sell

## BE YOUR OWN BOSS

**Earn more from the start!** Set up your own profitable business, in your own home, enjoy steady income, independence for life. You're in demand—in good times and bad—in the booming field of Custom Furniture Upholstery. Right off you start learning and earning with tools, complete frames, fabrics and materials, included FREE with N.Y. State-approved UTS course. You learn skilled professional custom upholstery, reupholstery, furniture finishing, repairs, how to make beautiful slip covers, cushions and draperies. **EARN WHILE YOU LEARN**, in your spare time **AT HOME**... the UTS easy way.

**FREE ILLUSTRATED BOOK FREE SAMPLE LESSON**  
Get ready for well-paid job and big profits, from steady work, as your own boss, running your own business. Mail coupon NOW for FREE BOOK! Training in N. Y. School also available. **APPROVED FOR VETERAN TRAINING**

**UPHOLSTERY TRADES SCHOOL**  
Dept. MB-1610, 721 B'way, N. Y. 3, N. Y.  
Please send me FREE book "Your New Way to a Successful Career" and FREE sample lesson. No obligation—no salesman will call.  
☐ Home Study ☐ Training in N. Y. School

Name \_\_\_\_\_  
Please Print Plainly  
Address \_\_\_\_\_  
City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_  
☐ Check if Korean Veteran

**LINGUAPHONE**  
MAKES IT EASY TO LISTEN and LEARN to  
*Speak*

**SPANISH** [American or European] • **FRENCH**  
**GERMAN** • **ITALIAN** • **RUSSIAN**  
**MODERN GREEK** • **JAPANESE**

Any of 34 languages available at home

Only LINGUAPHONE. The World's Standard Conversational Method, brings 8 to 12 of the world's best native language teachers into your home on fine, life-like recordings.

It's like living in another land. You listen. You hear native men and women converse about up-to-date, everyday matters. You Understand. You SPEAK quickly, easily, naturally. You acquire a true accent no TEXTBOOK CAN TEACH.

Exciting Business. Travel Opportunities Here and Abroad.

Linguaphone is used around the world by schools, governments, business firms. Over a million home-study students of all ages have learned another language this ideal, conversational way.

Stop Wishing—Start Talking! Send for FREE Book—Details of FREE TRIAL. Linguaphone Institute, T-147-020 Radio City, N. Y. 20.



# Short Cut <sup>TO</sup> A Good Job

## Learn Auto Mechanics at Home in Spare Time

The auto-repair industry makes it easy for you to gain success! Consider the rewards: A mechanic earns excellent pay—up to \$3 an hour. He works steady—there are 100,000 job opportunities. He can go in business—America needs 25,000 more shops.



Let CTI train you at home. Along with simple, illustrated lessons, you get professional Mechanic's Tools and fine-quality Testing Instruments. CTI also includes instruction on Diesel Mechanics or Body & Fender Rebuilding at no extra cost. You may earn cash as you train. Mail coupon today for booklet and lesson samples.

**COMMERCIAL TRADES INSTITUTE** Dept. A1229  
1400 Greenleaf Avenue • Chicago 26, Illinois  
Send booklet, Make Big Money in Auto Mechanics.

Name \_\_\_\_\_ Age \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_  
Accredited by National Home Study Council



## START A BUSINESS this quick way



### with these 2 machines you can sharpen ALL HAND AND POWER LAWN MOWERS

Here's a business you can start in spare time, and begin to make a CASH PROFIT right away. The Foley Lawn Mower Sharpener handles up to 3 or 4 reel type mowers per hour. Prices run \$2.00 to \$3.00 for hand mowers, \$5.00 to \$8.00 for power mowers. You get 99¢ profit out of each dollar.

With the Foley Grinder you can sharpen rotary power mower blades, rip, cross-cut and combination circular saws, dado heads, ice skates, knives, scissors, shears, all sharp-edged tools.

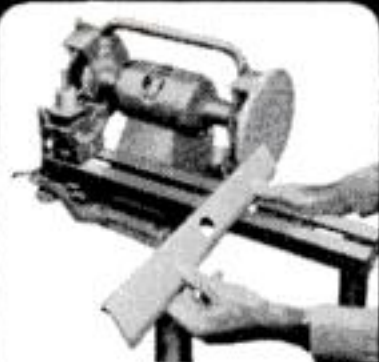
**FREE PLAN** tells how to put yourself right into a home business that will pay you \$3 to \$6 an hour. Send coupon today for FREE BOOK on how to sharpen power mowers and Special Combination Money Saving Offer. No obligation—no salesman will call.



**FOLEY MFG. CO., 208-O Foley Bldg., Minneapolis 18, Minn.**  
Send Free Plan on lawn mower business and Special Combination Offer.

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_



### FOR ROTARY POWER MOWER BLADES

The Foley 314 Grinder puts a perfect cutting edge on all rotary power mower blades.



## TIRED OF HIGH RENT?

Learn how luxurious suburban **MOBILEHOMES** can save money and expensive moving. Comes fully and smartly furnished, including many major appliances. Modern mobilehomes have every home comfort. Conditioned air provides comfort in any climate. Multiple bedroom units have convenient spacious storage areas. Mobilehomes give you mobility, easy care, minimum maintenance. Learn how in **TRAILER TOPICS**—the magazine of luxury low cost living.



**SPECIAL OFFER** \$1.00  
4 month subscription only

## TRAILER TOPICS magazine

Suite 1515, 28 E. Jackson Blvd., Chicago 4, Ill.



## "\$7,108.50" FIRST YEAR SERVICING RADIATORS!"

— Hank Konter, Newcastle, Wyo.

Make good money servicing auto-truck-tractor radiators. Easy to learn. Inland, world's largest radiator equipment mfg., offers complete package — equipment, merchandising, "pays-for-itself" financing, free training. Small down payment on equipment starts you. Profitable dept. for garage or service station. Write

**INLAND MFG. CO., Dept. PSM-2, 1108 Jackson St., Omaha 2, Nebr.**

**NEW!**  
ISOTRONIC  
METHOD

## LEARN TV REPAIR IN ONE SHORT WEEK!

Now, after 5 years research—a streamlined training system! Earn up to \$150 weekly, in just 7 days. No expensive training, equipment, or long study. Learn to service TV sets instead of building them! Most practical method yet—developed by leading scientists with cooperation of major TV mfg.'s! Send for details and **FREE SAMPLE LESSON**. Use it on your set—repair it!—convince yourself! Write: TV Servicing Systems, Dept. D-182, 1038 So. La Brea, Los Angeles 19, California

**FREE!**  
Sample  
Lesson

## MAKE MONEY!

## REPAIR HYDRAULIC JACKS



### Earn While You Learn At Home

Make up to \$5 an hour, full or part-time, in the competition-free field of Hydraulic Jack Repair. Millions of jacks in auto service stations, truckers, body shops, riggers, farms, need servicing. We show you HOW. Easy step-by-step directions.

Write for Folder PS-2, and Free Bonus Offer

**Institute of Hydraulic Jack Repair**

P.O. BOX 50 • BLOOMFIELD, N.J.  
A Correspondence School Licensed by N.J. Bd. of Ed.

## MAKE BIG MONEY—ALL PROFIT—AT HOME

## INVISIBLE MENDING

Pays up to \$10 in an Hour!

Make moth holes, cigarette burns, tears, rips, disappear from all fabrics. Little-known craft pays extra spare-time profits at home. Write today for exciting details **FREE!**

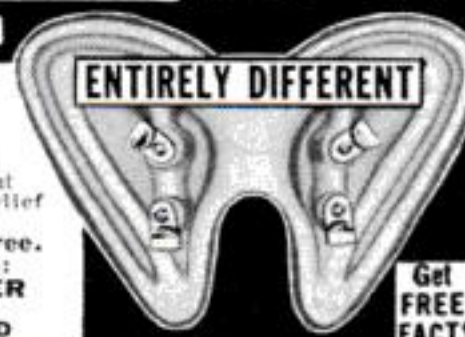
**FABRICON, 6238 Broadway**  
DEPT. 552 • CHICAGO 40, ILLINOIS



## RUPTURED? NEW LASTING RELIEF

ENJOY NEW FREEDOM

Yes, enjoy new freedom of action, amazing peace of mind and comfort at work or play. New pleasures replace rupture pain. The proven, patented **MILLER** holds your rupture back Day and Night... bringing you new lasting relief as it has thousands of others. **FREE! Write for relief FACTS free.** Send name and address to:  
**Dept. 3-B FRED B. MILLER**  
Exclusive Manufacturer  
HAGERSTOWN, MARYLAND



ENTIRELY DIFFERENT

Get  
FREE  
FACTS

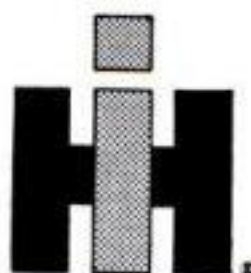




## Step into a profitable year 'round business with an International 240 Utility tractor

Earn steady profits with a rugged, low-cost 38.5 hp International 240 Utility! Dozens of homeowners, business, and industrial plants in your neighborhood are prospects. Landscape, trench, load, mow, clear snow, do countless other utility jobs, with an economical "240". A complete line of equipment is available to keep you busy the year 'round. A small down payment can start you in a full-time business of your own.

See your nearby IH dealer for a demonstration of International 240 power, brawn, and performance. Or write today for free catalog.



**INTERNATIONAL  
HARVESTER**

Dept. PS-2, P. O. Box 7333, Chicago 80, Ill.

## Sensational Device Tests Eyes



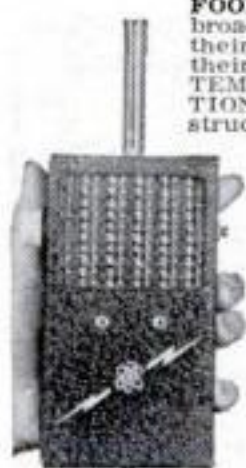
**SAVES up to \$15.00 on Glasses!**  
Bring BIG news to the millions of Spectacle Wearers and Prospects. Means Freedom from Outrageous Prices. Sold on Money-back Guarantee.

### MAKE BIG MONEY QUICK—FREE SAMPLE KIT!

Show it to friends and others. Let them use it Free and watch their amazement over this Self Testing system. Here is a great new opportunity in a tremendous new field of unlimited possibilities. Spare or full time. No experience needed. Write for Free sample kit.

**C. G. Optical Co., Dept. AA-140, 20 E. Delaware Pl., Chicago 11, Ill.**

## AMAZING MINIATURE BROADCAST TRANSMITTER



**FOOL YOUR FRIENDS** with this transmitter . . . by broadcasting on to any radio or car radio and watch their startled faces when they hear YOUR voice on their radio. Can be used as **FUN MAKER, P.A. SYSTEM, WALKIE TALKIE, CAR TO CAR COMMUNICATIONS** and MANY OTHER USES described with instructions. Use on **HUNTING** and **FISHING TRIPS**.

Completely portable (5 3/8 x 3 1/8 x 1 5/8) with self contained batteries and equipped with **TELESCOPING ANTENNA. ABSOLUTELY WIRELESS** . . . no wires to run to your radio . . . **NO GROUND WIRES** or **HOOKUPS** to make on transmitter . . . Works up to **ONE BLOCK OR MORE** . . . **NO LICENSE REQUIRED**. If used within legal FCC limits. The "SPACECASTER" transmits **THROUGH WALLS!** **SIMPLY** push the button and talk!

The "SPACECASTER" has a built-in station selector so you can tune in on any station you desire!

Three models: M27—\$9.95; higher powered M37—\$10.95; super power de luxe M47—\$12.95 post paid. Or send just 1.00 & pay postman balance. Batteries 2.50 extra. Kits now available, all models, two dollars less than above prices. Soon available; Citizens' Band Walkie-Talkie. Write for information.

Available only from **HALCO ELECTRONICS, DEPT. E**  
9211 Venice Blvd., Los Angeles 34, California

Turn your spare time into \$\$\$

## WATCH REPAIRING



### Learn this profitable trade at home the Sweazey Way

Opportunities now for full or part time earnings in watch repairing are the best in years. Unique Sweazey System teaches you at home step by step how to repair all types of American and Swiss watches. Professionally prepared training from recognized trade school, established 1908. You learn modern shop methods. Special tools provided for practice. No previous experience needed. Age is no barrier. Diploma awarded. Tuition is only \$5 a month. Send for **FREE SAMPLE LESSON** without obligation. No salesman will call.

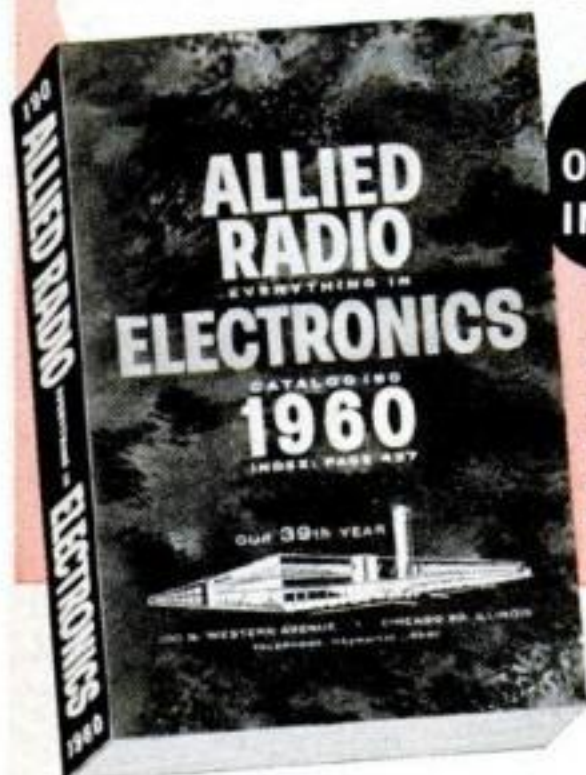
**CHICAGO SCHOOL OF WATCHMAKING**  
2330 N. Milwaukee Ave., Dept. 420, Chicago 47, Illinois



**FREE**

it's value-packed...  
SEND FOR IT!

## ALLIED'S MONEY- SAVING 1960 ELECTRONIC SUPPLY CATALOG



**SAVE  
ON EVERYTHING  
IN ELECTRONICS**

**ONLY \$2 DOWN**  
on orders up to \$50;  
only \$5 down on  
orders up to \$200;  
\$10 down over \$200.

### Largest Selection—Lowest Prices

Send for the most widely used  
buying guide to everything in  
Electronics for Builders,  
Experimenters, Hi-Fi fans,  
Amateurs, Servicemen and  
Engineers. Save on:

- **KNIGHT-KITS®**—Best in Build-Your-Own
- Everything in Stereo Hi-Fi
- Hi-Fi Music Systems and Components
- Tape Recorders & Phono Equipment
- TV Tubes, Antennas, Accessories
- Parts, Tubes, Transistors
- Everything in Tools & Technical Books
- Amateur Station Equipment
- Public Address & Paging Systems
- Latest Test & Lab Instruments

SAVE on everything in Electronics  
at ALLIED—get fastest service,  
expert personal help, guaranteed  
satisfaction. Send today for your  
**FREE 1960 ALLIED Catalog.**

our 39th year

**ALLIED RADIO**

ALLIED RADIO CORP., Dept. 7-B  
100 N. Western Ave., Chicago 80, Ill.

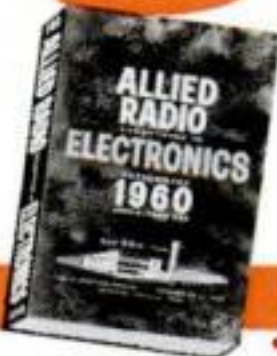
☐ Rush **FREE 1960 ALLIED Catalog.**

Name

Address

City  Zone  State

**SEND FOR  
FREE  
CATALOG**



## 508 *Different* STAMPS

CATALOG VALUE \$15 *Yours* FOR ONLY 35¢



THIS fabulous offer is made to win new  
friends for Littleton. 508 different  
stamps—from all over the world—for  
only 35¢! Standard catalog value guar-  
anteed to be at least \$15. Imagine the  
excitement of owning exotic stamps from  
Nationalist China, the United Arab Re-  
public (shown here), Morocco, Indonesia,  
Pakistan, and many other legendary  
lands! Yes, you get a really generous as-  
sortment from every continent—for only  
35¢ with approvals. (Offer open to adults  
only.) Simply rush your name and ad-  
dress, and only 35¢ to: **LITTLETON  
STAMP CO., Dept. PS-2, Littleton, N.H.**



**LEARN  
NOW!**

How to Become a  
• **GAME WARDEN**  
• **GOVT. HUNTER**  
• **Forest Ranger or Aid Positions**

Let your love of field and forest guide you to real  
success! Be a career conservationist!—Protect re-  
sources. Arrest violators. Work with wildlife amid  
scenic surroundings, away from city pressures. En-  
joy a "way of life" others can't even buy! Good pay,  
security, prestige. Full time and seasonal opportu-  
nities, men 17 to 45! Hunting, farming, military ex-  
perience valuable. Prepare now, spare time. Write!

**North American School of Conservation**  
Dept. D112, 1038 South La Brea, Los Angeles 19, California



**FREE Colorful  
"CAREER BOOKLET"**

If over 17 write NOW!

## SIGN PAINTING

Home-Study Course—Only \$5.95

Teaches you commercial sign painting and  
sign building as it is being done TODAY  
in leading shops all over the country. Com-  
plete practical course for self-instruction.  
Shows latest methods of truck lettering,  
office doors, wood letters, reflecting signs, plas-  
tics, sprayed signs, gold leaf, silk screen process, up-  
to-date alphabets, money-making business information, etc.

**SATISFACTION GUARANTEED OR REFUND!** Contains all the instruc-  
tion of a high-priced correspondence course. Full price, only \$5.95,  
postpaid. Or C.O.D. plus postage. No risk—order today. Satisfaction  
or money back! Order "Sign Painting Course."

**NELSON-HALL CO., 210 S. Clinton St., Dept. 2BR-1, Chicago 6, Ill.**



## Free Book on Arthritis And Rheumatism

**HOW TO AVOID CRIPPLING DEFORMITIES**

Explains why drugs and medicine give only temporary relief and  
fail to remove the causes; tells all about a specialized non-  
surgical, non-medical treatment which has proven successful  
since 1919. Write for this 36-page **FREE BOOK** today.

**BALL CLINIC**

Dept. 36

Excelsior Springs, Mo.

## GOVERNMENT OIL LEASES LOW AS \$1 PER ACRE.

You do no drilling, pay no taxes, may realize a  
king-size profit without ever leaving home. Write  
for free map and literature.

**AMERICAN OIL SCOUTS, Dept. PS**

8350 Santa Monica Blvd.

Los Angeles 46, Calif.

## GUNS

COLLECT NOW!

- ☐ Colt Cobra .38
- ☐ German Luger
- ☐ German Mauser
- ☐ Spanish Moxley
- ☐ Russian Tokarev
- ☐ Japanese Nambu
- ☐ Italian Brevettata
- ☐ Frontier .44 Colt
- ☐ Belgium Automatic
- ☐ Colt .45 Automatic
- ☐ Czechoslovakian Pistol
- ☐ S & W .38 Police Special

**\$395**  
PPD.

**Authentic Replicas**  
Reproduced in Ac-  
tual Size, Design  
and Balance, Solid  
Cast Aluminum.  
Finished in  
Gunmetal  
Black.



1958

He-man trophies  
for Den, Rumpus  
Room, Cabin, Etc.

**LYTLE NOVELTY CO.,**

Send 10 cents for illustrated folder.  
Dept. S-2 Box 9068  
Long Beach 10, California



# NEW RUBBER STAMP BUSINESS PAYS BEGINNERS UP TO \$9.20 AN HR.

**START AT HOME  
IN SPARE TIME**  
with Table Top Machine!

The multi-million dollar Rubber Stamp business—once controlled by a few big companies—is now being taken over by small operators—one in each community throughout the United States. Men and Women who have this inexpensive machine can turn out huge quantities of Rubber Stamps with special wording that buyers once were forced to buy from big cities. Material costing only 27c makes a stamp that sells for \$1.80. The machine that does the work is simple and easy to operate and it turns out as many as six Rubber Stamps at a time, each with different wording such as names, addresses, notices, stock numbers, prices and other "copy" needed by offices, factories and individuals. Working full capacity, it can earn as much as **\$9.20 an hour for the operator!** Now you can get into the big-pay business yourself, with your own home as headquarters. You don't need experience. We supply everything, including complete instructions and eight ways to get business coming in fast. Start making up to \$9.20 an hour from the very beginning. Cash in on the profitable Rubber Stamp business in your community, right away. We'll mail full particulars **FREE** and no salesman will call. Be first in your locality. Rush coupon today or send your name on postcard to

**RUBBER STAMP DIV., Dept. R-3-B**  
1512 JARVIS AVENUE • CHICAGO 26, ILLINOIS



**RUBBER STAMP DIV.**  
1512 Jarvis Ave., Dept. R-3-B  
Chicago 26, Illinois

**FREE!**

Please rush full particulars about the little machine that can get me started in the profitable Rubber Stamp business at home in spare time. Everything you send me is **FREE** and no salesman will call.

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ ZONE \_\_\_\_\_ STATE \_\_\_\_\_

**FREE**  
THE HISTORY OF  
THE COMPASS  
SEND FOR YOUR COPY

**New DINSMORE**  
*Celebrity*  
COMPASSES

in Beautiful GOLD OR SILVER

A jeweled, precision instrument—designed for modern cars. Full, indirect illumination. Sharp, clear letters. Silver or gold Celebrity models \$7.45, standard models \$5.95, illuminated \$6.95  
**APPROVED BY AUTO MAKERS**  
Fine Quality Compasses for over 31 Years

**DINSMORE INSTRUMENT CO.**  
1804 Kelso St., Flint 1, Mich.



Write  
for Folder



can open the door  
to a **BETTER JOB** at  
**BIGGER PAY** for YOU

**TODAY, CHOOSE YOUR CAREER!** Then take the first easy step toward preparing for the goal you can reach *in spare time at home*. Or, if you are in work you like, learn how you can earn quicker promotions and bigger pay. For 63 years AMERICAN SCHOOL has helped many thousands of ambitious people succeed. Think seriously about the subjects listed. Fill in and mail coupon today.

AMERICAN SCHOOL, Dept. G246, Drexel at 58th, Chicago 37, Ill.  
Without obligation, send FREE information on the subjects I have checked.

Accounting	Dieel Technician	Machinists
Apprenticeship Courses	Drafting—Building Trades	Mechanical Engineering
Architecture & Building	Drafting—Machine Trades	Mechanical Technology
Automotive Technician	Electrical Engineering	Metalworking Courses
Better Foremanship	Electricity—Practical	Plumbing—Practical
Bookkeeping	Electronics—Industrial	Private Secretary
Business Management	HIGH SCHOOL COURSES	Retail Merchandising
Civil Engineering	Human Relations	Sheet Metal Work
Contracting	Instrumentations	Tool Making

NAME \_\_\_\_\_ OCCUPATION \_\_\_\_\_

HOME ADDRESS \_\_\_\_\_ AGE \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_

Accredited Member NATIONAL HOME STUDY COUNCIL

**POPULAR PRICED  
RIFLESCOPE**  
\$9.95 including  
Mount



*Pin  
Pointer "75"*

The "Pin Pointer 75" is especially designed to meet the growing need for a moderately priced precision instrument. Designed for installation on over 350 U.S. and Foreign make rifles, including the popular Enfield, the unit is complete with your choice of mounts. Score a bullseye for these features:

- Centered crosshairs — shock mounted • Coated precision glass optics throughout • Color corrected • Long eye relief — 2½ to 4"
- Internal adjustments • Choice of power — 2½X — 4X — 6X • Wide field — 40' at 100 yrd — 2½X • .750 tube diameter • Steel construction — permanently blued • Price includes mount... 350 types available • All parts designed & manufactured in the U.S.A.

Jobber dealer inquiries invited

**PAN TECHNICS, LTD.**

P. O. Box 578, Encinitas, Calif. Dept. PS2



# Do You Like Art?

## DRAW FOR MONEY!

**Our Simple Method Proves You Can Learn to Draw at Home in Spare Time for only 20c a day**

**YOU** can learn Commercial Art, Designing, Painting, Cartooning, TV, etc. . . . right at home, in spare time. No previous art training necessary. Soon be your own boss — work at home, pick your own working hours. Or earn big money as staff artist for advertising agency, newspaper, magazine, dept. store, etc. Or make Art a profitable hobby. Earn while you learn. TWO 22-piece art outfits given AT NO EXTRA CHARGE. (Est. 1914.)

**FREE BOOK, "ART FOR PLEASURE AND PROFIT."** Describes our methods. Lists opportunities. Tells what our students say. No obligation. So mail coupon at once.

**FREE BOOK**




**Washington School of Art**  
**Studio 152, Port Washington, N. Y.**  
 Send me—FREE—your valuable illustrated Book, "Art for Pleasure and Profit." No obligation. No salesman will call.  
 Name..... Age.....  
 (PLEASE PRINT PLAINLY)  
 Street.....  
 City..... Zone..... State.....

### Superior's New Model 70 UTILITY TESTER® FOR REPAIRING ALL ELECTRICAL APPLIANCES MOTORS • AUTOMOBILES • TV TUBES

As an electrical trouble shooter the Model 70:



- Will test Toasters, Irons, Broilers, Heating Pads, Clocks, Fans, Vacuum Cleaners, Refrigerators, Lamps, Fluorescents, Switches, Thermostats, etc.
- Will test all TV tubes for open filaments, inter-element shorts, burned out tubes, etc.
- Measures A.C. and D.C. Voltages, A.C. and D.C. Current, Resistances, Leakage, etc.
- Will measure current consumption while the appliance under test is in operation.
- Incorporates a sensitive direct-reading resistance range which will measure all resistances commonly used in electrical appliances, motors, etc.
- Leakage detecting circuit will indicate continuity from zero ohms to 5 megohms (5,000,000 ohms).

As an Automotive Tester the Model 70 will test:

- Both 6 Volt and 12 Volt Storage Batteries • Generators • Starters • Distributors • Ignition Coils • Regulators • Relays • Circuit Breakers • Cigarette Lighters • Stop Lights • Condensers • Directional Signal Systems • All Lamps and Bulbs • Fuses • Heating Systems • Horns • Also will locate poor grounds, breaks in wiring, poor connections, etc.

Model 70 comes complete including 64 page book, only..... **\$15.85**

**SHIPPED ON APPROVAL  
 NO MONEY WITH ORDER — NO C. O. D.**

Try it for 10 days before you buy. If completely satisfied then send \$3.85 and pay balance at rate of \$4.00 per month for 3 months — **No Interest or Finance Charges Added!** If not completely satisfied, return to us, no explanation necessary.

**MOSS ELECTRONIC, INC.**  
 Dept. D-708 3849 Tenth Ave., New York 34, N. Y.  
 Please rush Model 70. If satisfactory, I will pay on terms specified. Otherwise I will return tester.

Name.....  
 Address.....  
 City..... Zone..... State.....  
 All prices net, F.O.B., N. Y. C.

## \$1 BRINGS YOU \$18

**Discover Flok-Kraft and Earn \$\$\$\$\$ AT HOME**

Earn up to \$15.00 per hour spare time. Amazing new Velvet-fiber spray instantly makes any object (Lamps, Radio & TV Cabinets, Figurines, Signs, Auto dash boards, toys, furniture, draperies—anything) worth expensive \$8888 Prices . . . like magic, you can spray anything with this beautiful new suede-like finish that feels like rich Velvet.

**EARN UP TO \$300.00 PER WEEK SPARE TIME**

Imagine, materials cost only 3c per square foot. (Average TV or radio cabinet can be beautifully sprayed with this startling new 3-dimensional Velvet finish in 15 minutes at a cost of only 34c in materials. Your charge for this job is at least \$10.00.)

**REPRESENTATIVES IN YOUR AREA URGENTLY NEEDED**

Own your own business. Work at home in your spare time. Help fill the huge growing demand for this amazing new beautiful Velvet-fiber finish. Orders come from stores, offices, homes, architects, auto dealers,—everywhere. Possible \$20,000,000.00 worth of jobs to be done. Investigate today—be first in your area!

Actual samples in 16 Radiant Colors. Booklet of 50 Home Business Opportunities and Confidential Details all sent free! Send no money. Write: **Coast Industries, Los Angeles 61, Calif., Dept. A-2.**

### NEW Improved Accurate Scope-Shot

Price Complete with 50 DISINTEGRATING PELLETS \$1.95 P.P.  
 They crack like a rifle when they hit—leave mark—puff of smoke!

World's Finest Precision SLINGSHOT Scope-type sight!  
 Millions Sold! Patent No. D-178,837

Big Bag of 250 EXTRA Pellets 98c P.P.

Pure gum rubber slings. Beautifully polished cast aluminum stock. Pistol grip. So powerful it kills small game. Fits pocket perfectly! Guaranteed. **FREE** shooting manual.

Order NOW from: **GENERAL SPORTS**  
 4184-PB Apple Street, Cincinnati 23, Ohio

**ROUTS PESTS!**  
 Price without pellets \$1.50 P.P.  
**Order Now!**

## LEARN WHILE YOU SLEEP!



Experiment in this fascinating, educational new field. Use your phono, recorder or amazing new "Electronic Educator" endless tape recorder. Free catalog lists over 200 unusual tapes, records, equipment for sleep-learning & hypnosis experimenters. Sleep-Learning Research Ass'n., Box 24-K, Olympia, Wash. .

## MEN WANTED

**Earn \$100 Per Week and up  
 AUTO DIESEL MECHANICS**

Master a trade with a future—learn Auto-Diesel mechanics in our shops. You learn with tools on real equipment. Earn while you learn. Many of our graduates earn \$100 per week and up. No previous experience necessary. Day and night courses. Approved for veterans. Write for free bulletin.

**NASHVILLE AUTO-DIESEL COLLEGE**

226 7th Ave., N., Dept. 41

Nashville 3, Tenn.



**BULOVA 17 JEWEL  
 WATCHES** ORIG. \$60.00  
 UP-TO \$60.00

**UNLIMITED  
 SERVICE  
 GUARANTEE**

**SAVE UP TO \$50  
 NOW ONLY.. \$9.95** Plus tax

Choice of Bulova, Elgins, Benrus, Gruen, Waltham and other Famous Makes. All fully guaranteed. These like new, unredeemed watches can be yours at a fraction of original prices.

17 & 21 Jewel Movements. Latest style yellow gold, stainless steel or waterproof cases. State preference. Only \$9.95 plus \$1.00 tax. **TRIAL OFFER . . . WEAR AT OUR RISK.** Money back guarantee in 10 days if not delighted. Send only \$1.00 with order. Pay balance C.O.D. plus postage. Or enclose \$9.95 plus \$1.00 tax with order, and we include Reg. \$3.95 matching expansion band **FREE**. Order Now!  
**GORDON'S, Dept. P.S. 22, Odenton, Md.**

**SEND  
 ONLY  
 \$1.00**





# Save 1/2 on NEW ACCORDIONS

Famous Italian Makes at IMPORTER-TO-YOU PRICES

OVER 40 EXCITING  
1960 MODELS

for  
**STUDENTS  
TEACHERS  
PROFES-  
SIONALS**

**DOUBLE  
GUARANTEE**

Small Down Payment  
**BUY ON E-Z TERMS 5-DAY FREE TRIAL**

**WORLD'S LARGEST ACCORDION DEALER** brings you these sensation-  
al values! Prices slashed on all our fine Italian-Made accordions! Here's  
your opportunity of a lifetime to play the most popular instrument of all.  
**Have fun, be a leader!** Choose from 40 newest models that lead the world  
in superb tone and breathtaking beauty. All latest improvements and fea-  
tures. Buy direct from the Importer! **You save up to 50%** off manufac-  
turer's list prices. Small down payment; pay the balance on easiest terms.  
Big trade-in allowances. Try before you buy on **FREE 5-DAY NO RISK**  
**PLAN. DOUBLE GUARANTEE!**

## FREE BONUS GIFTS for promptness . . .

- Easy-to-play music • Music Stand
- Name in chrome letters
- Deluxe Case • Music Portfolio
- Plus Other Valuable Gifts

## MONEY BACK GUARANTEE

See how easily you can own and play a  
fine accordion . . . made in Italy by skilled  
old world craftsmen. Your satisfaction  
guaranteed or your money back. Rush  
coupon for big new Color Catalogs and  
lowest Importer-To-You discount prices  
. . . all FREE. No obligation. Write

**ACCORDION MANUFACTURERS  
and WHOLESALERS OUTLET**

P-20, 2003 W. Chicago Ave., Chicago 22, Ill.

## FREE! GET COLOR CATALOG and Low Discount Prices

**Accordion Manufacturers and Wholesalers Outlet**  
Dept. P-20, 2003 West Chicago Avenue, Chicago 22, Ill.

Send Free Color Catalogs and Low Discount Prices

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ ZONE \_\_\_\_\_ STATE \_\_\_\_\_

**\$3<sup>00</sup>**  
post-  
paid  
*Special  
Factory Offer*



*Long Barrel*  
**.12 CALIBER**

## NEW WESTERN HAIG USES 4.4 MG. POWDER CHARGE

This small bore gun shoots .12 cal. lead bullets fired by small 4.4  
mg. powder charge. Not a CO<sub>2</sub> gun! You'll like the handsome  
lines, grip, and balance. Western in style, but patented ball and  
cap action allows this low price. 9 3/4" steel barrel cased in knurled  
styrene stock, overall 13 1/2". Develop pistol form, accuracy at a  
fraction of cost of large caliber pistols. Comes with 50 lead bul-  
lets. Satisfaction guaranteed. Send \$3 to:

**HAIG MFG. CO., Box V-27, Alhambra, Calif.**

# LEARN MEAT CUTTING AT NATIONAL Pay After Graduation



The steady dependable trade of Meat Cutting taught  
easily in 8 short weeks. **YOU LEARN BY DOING**  
under actual meat market conditions in big modern  
school at Toledo.

For beginners or men with experience. Get a profit-  
able store of your own. Remember **PEOPLE MUST  
EAT!** Big pay jobs. Free employment help. Thousands  
of successful graduates.

Buying, cutting, percentage, pricing, advertising, sell-  
ing, etc. A complete retail meat education. National  
School established 37 years. Get National training  
**NOW.** Pay your tuition in easy weekly payments

after you graduate. Send coupon for **FREE** school cata-  
log—**TODAY.** G.I. approved.

**National School of Meat Cutting, Inc.**  
Dept. 51-B, Toledo 4, Ohio

Send me your **FREE** school catalog on National Training at  
Toledo in Meat Cutting, Meat Merchandising and Self Service  
Meats. No obligation. No salesman will call.

Name ..... Age .....

Address .....

City ..... State .....

Approved for Veterans





# **To make it easier for you...** **We've moved classified advertising** **to a better business location**

## **In this issue, Classified Advertising Starts On Page 260**

POPULAR SCIENCE's giant Classified Advertising Market Place, one of the nation's most active business locations, has moved from the "middle of the block" to a brand new site "next to the corner" at the very end of the book—where mail order experts tell us we'll all be doing "business *better than usual*."

Something for everyman—from abacus

to zoomar—"bargain seekers" are sure to find it among the pages of POPULAR SCIENCE classified ads.

Buying or selling through POPULAR SCIENCE will be easier and more profitable for everyone in this more prominent and easier to find location where it will be open for business *every month* in the same place.

**Turn To Page 260 For The Beginning Of The Classified Section.**



Not everyone does as well, but T. N. CODY, who started a business of his own, reports...

For 12 months I've averaged

**\$800 PER MONTH INCOME**

**—most of it clear profit for me!**

Many men have discovered how to be independent, to be free of layoffs and bosses. C. G. Naples grossed more than \$200 his first week. A father-son combination grossed \$44,000 their second year. H. Lemon says, "I netted \$133 in one 8-hour day."

How much you make depends largely on you. You need no special skill, no large investment. Start part time if you wish.

**NO SHOP NECESSARY** • Our Electric Deterger shampoos rugs, carpets right on floor—removes dirt and grime and helps to show their natural color and beauty. So efficient and safe it is used by largest railroads and hotels.

► **This is not a lease proposition.** You own the machine, you work when and where you please and all the money you take in is your own. You take no risk. Machines fully guaranteed.



**MAIL COUPON TODAY FOR FREE BOOK**

**VON SCHRADER MFG. CO.**

211 "R" Pl., Racine, Wisconsin

Without obligation send me **FREE** booklet about your RUG DETERGER and tell me how I can start my own permanent, profitable business.

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

## RUPTURED

### BE FREE FROM TRUSS SLAVERY

Surely you want to **THROW AWAY TRUSSES FOREVER**, be rid of Rupture Worries. Then Why Do you put up with wearing a griping, chafing and unsanitary truss the balance of your life? If you do, it will NOT be through necessity but through choice on your part.

Now there is a new modern **Non-Surgical** treatment that is designed to permanently correct rupture. These **Non-Surgical** treatments are so certain, that a Lifetime Certificate of Assurance is given. Write today for our New **FREE** Book that gives facts that may save you painful, expensive surgery. Tells how **non-surgically** you may again work, live, play, love and enjoy life in the manner you desire. There is no obligation.

Excelsior Medical Clinic, Dept. H6224, Excelsior Springs, Mo.

## FORTUNES IN DIVING

### Train at Home in Spare Time

#### Write Today for Amazing Free Booklet

Here is one of the greatest opportunities of our time. Make big money fast in Skin and Lung Diving. Trained divers needed in hundreds of industries and by government. Build a successful business of your own. Hourly rates among highest paid in any field. Training program by E. R. Cross, world famous master diver. Get the facts now. Mail coupon for **FREE** BOOKLET TODAY!

DIVEMASTER, Dept. PS-20  
5637 W. 63rd Place, Chicago 38, Ill.

Send me free information about Diving.

Name \_\_\_\_\_ Age \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_



## FREE GIANT 1960 B-A CATALOG



**204**  
KING-SIZED  
PAGES

EVERYTHING  
IN RADIO  
TV AND  
ELECTRONICS

100'S OF  
NEW ITEMS  
LISTED HERE  
FOR 1st TIME

21 PAGES  
OF BARGAINS  
NOT IN ANY  
OTHER CATALOG

### BURSTEIN-APPLEBEE CO.

Dept. PS, 1012 McGee St., Kansas City 6, Mo.

☐ Send Free 1960 B-A Catalog No. 601.

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_

**SEND  
FOR IT  
TODAY**



## new FROM HEATHKIT® transistor clock radio



**EASY TO ASSEMBLE... COMPLETELY PORTABLE  
... UP TO 500 HOURS ON BATTERIES**

Take it with you... on trips, to the beach, in a boat... Nothing to plug-in, just goes and goes on inexpensive batteries. Lulls you to sleep, wakes you up, tells time and plays all day long. Leather carrying case available. **ONLY \$45.95.**



### HEATH COMPANY

Benton Harbor 16, Michigan

a subsidiary of Daystrom, Inc.

Send the latest Free Heathkit Catalog.

NAME

ADDRESS

CITY ZONE STATE

Note: Price subject to change without notice.

## ABSOLUTELY FREE!



**Amazing 48-page  
muscle-building  
course, with  
photos of  
Champs! HOW  
TO DEVELOP A**

## HE-MAN BODY!

TRADE IN that skinny, scrawny, milk toast body of yours for a jet-charged WEIDER physique — rippling with mountains of mighty muscle, oozing confidence and virility out of every pore! Now get my SENSATIONAL INTRODUCTORY MUSCLE-BUILDING COURSE — not for \$100, not for \$50 but **ABSOLUTELY FREE** if you act now!

Mail this coupon for your **FREE COPY**. See how easy it is to have a DYNAMIC HE-MAN BODY in just 15 minutes a day in your own home! Hurry, while offer lasts! Mail today!

JOE WEIDER, Dept. 100-20M  
801 Palisade Ave., Union City, N. J.

Rush **FREE** Power-Packed Muscle Building Course. I enclose 10¢ for handling and postage. (offer limited to men over 16)

Name .....

Address .....

City ..... State ..... Age .....

In Canada: Write Joe Weider, 4466 Colonial Ave., Montreal, Que.

60 POPULAR SCIENCE FEBRUARY 1960



## COMPLETE NEW FALSE PLATE

Made from your old one and returned to you by Air Mail the same day... low as \$15.95. New dental process needs no impression—guarantees perfect fit, miraculous comfort. Modern plates are lighter, stronger, more natural-looking. Save as much as \$100. Send no money—for free details just send your name and address now to **TRU-GRIP, 127 N. Dearborn St., Dept. 64, Chicago 2, Ill.**



Now!

## TEST YOUR OWN TV & RADIO TUBES

for filament breaks

**all of them—even picture tube**

Nearly half of TV service calls are due to defective filaments. Tester shows if filaments are good. Insert tube in tester. Light shows if tube is burned out. Easy, safe to use. One service call saved pays for tester. Metal case. AC or DC. Checks fuses, appliances, etc. Only \$8.98 ppd. or C.O.D. plus charges. Deluxe Model \$4.98. Instructions. Guaranteed. **GEIGER ENGINEERING CORP.**

6349 N. Western Ave.  
Dept. BC-114 Chicago 45, Ill.



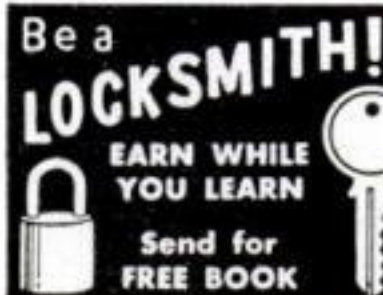
## Print Your Own

Cards, Stationery, Advertising, Circulars, labels, photo and movie titles, church work, tags, etc. Save money. Sold direct from factory only. Raised printing like engraving, too.

### Own a Printing Business

Print for Others, Good Profit. Have home shop. Junior press \$15; Senior \$29 up. We supply everything. Easy rules. Pays for self in short time. Write for free catalog of outfits and all details.

**KELSEY PRESSES, C-33 Meriden, Conn.**



**LOCKSMITHING INSTITUTE, Dept. 202, 150 Park Ave., E. Rutherford, N. J.**  
Licensed by State of N.J. Vet Approved

## TERMITES?

GET RID OF  
THEM YOURSELF!

Don't pay up to \$300 and more to get rid of termites or prevent infestation. Do-it-yourself—Easily! Quickly! Inexpensively with "TERM-OUT" solution. Send 10¢ for fact-filled handbook.



**COMPASS RESEARCH**

701-B INVESTMENT BLDG., PITTSBURGH 22, PA.



## 100 GOLD INITIALS \$1

Make your own MONOGRAMS with these instant self-adhering RAISED GOLDEN INITIALS and personalize ANY item for pennies! Adheres PERMANENTLY to LEATHER, WOOD, PLASTIC, METAL, GLASS, PAPER, CLOTH, CERAMICS, etc. Looks and feels like expensive 14-K GOLD METAL INITIALS. Not affected by heat or cold. Personalize your own items or gifts. KIT OF 100 ASSORTED A to Z INITIALS only \$1.00. Two Kits, \$1.75 ppd. Mailed first class. Money-back guarantee.

**IMPERIAL MONOGRAMS, INC., Dept. 111**  
150-26 HILLSIDE AVE. JAMAICA 32, N. Y.

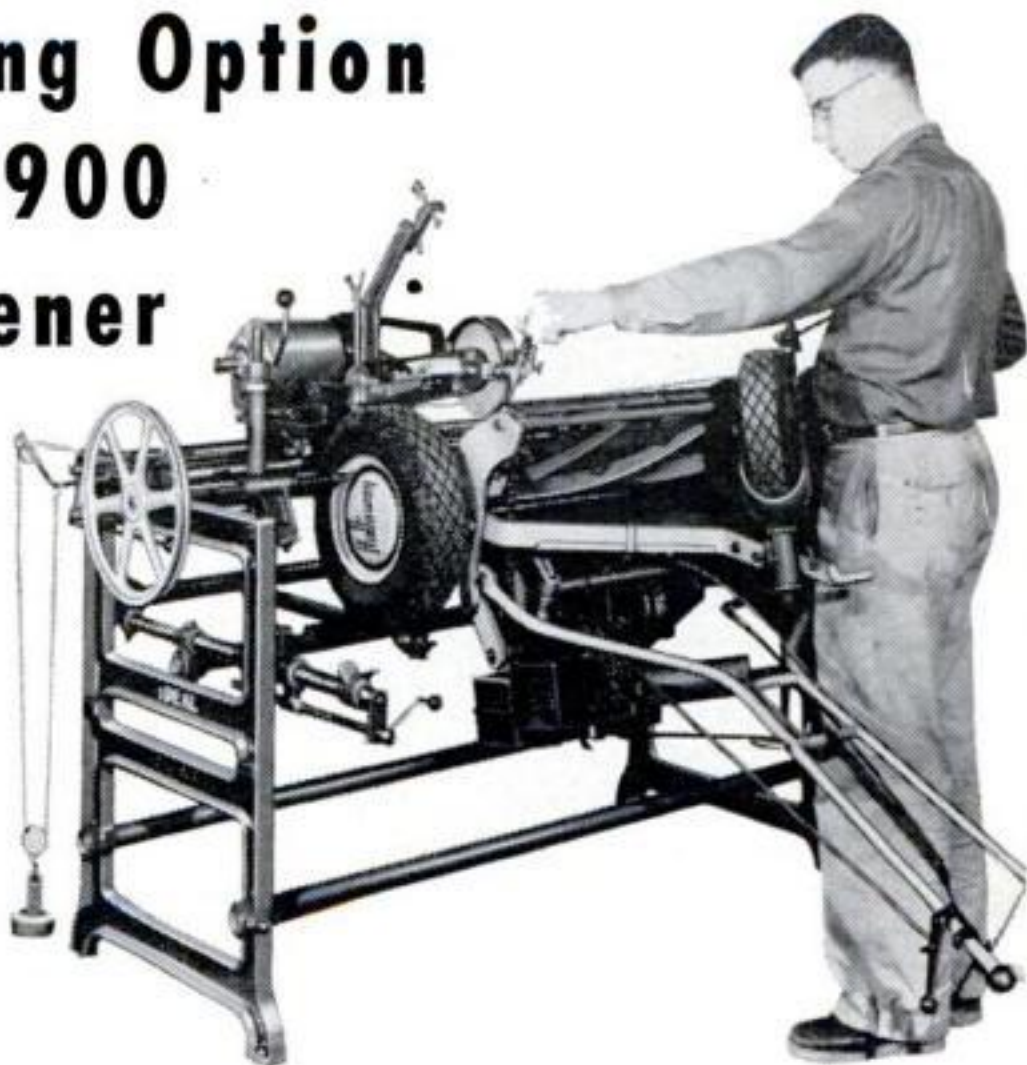


# Big Volume and Big Profits are yours...with versatile "Two-Way" Grinding Option on the New IDEAL 900 Lawnmower Sharpener

New heavy-duty IDEAL MODEL 900 sharpener precision grinds either by "hook" or "straight-line" method for EXTRA VOLUME and EXTRA PROFIT. Unit sharpens all kinds of reel-type mowers from the smallest edger to the largest fairway or power machine.

## Outstanding Features Include:

- Gravity Feed • Screw-type Adjustments
- 1/2 h.p. Motor • 6-inch Grinding Wheel
- Includes Bed-knife Grinding Bar, Reconditioner and Tool Tray



**THE FATE-ROOT-HEATH COMPANY**  
Dept. PS-2 • Plymouth, Ohio

Write today for full details on the  
**NEW IDEAL MODEL 900**

## OUTER SPACE SHIP X-15

Order any one of these official U. S. planes

- ☐ B-150 BOEING B-52 STRATOFORTRESS
- ☐ B-152 BOEING 707 JET STRATOLINER
- ☐ C-312 CONVAIR B-58 "HUSTLER"
- ☐ L-594 LOCKHEED F-104A STARFIGHTER
- ☐ R-824 REPUBLIC F-105 "THUNDERCHIEF"

**10c**  
ea.

**AVIATION PHOTO EXCHANGE**  
BOX 75084C, LOS ANGELES 5, CALIF.

**SEE PAGE  
249  
FOR  
SPLIT-LEVEL  
CONTEST  
WINNERS**



## FREE Vacation Guide to TENNESSEE

Tells all about the Great Smoky Mts. National Park, Tennessee's 22 Great Lakes and water sports, battlefields, homes of 3 presidents, fine family accommodations, etc. Mail coupon today.

**MOUNTAINS • LAKES • HISTORY**



**40 Pages  
116 Pictures  
41 in Color**

TENNESSEE DIVISION OF INFORMATION  
2167 Cordell Hull Building, Nashville, Tenn.  
Please send Free Vacation Guide

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY & STATE \_\_\_\_\_



## Smog Relief? Next Year, Maybe



**Smog control around the corner?** Devices to absorb automobile exhausts are on the way but, news headlines to the contrary, they probably won't be available for at least a year.

Southern Californians—who suffer most vocally from smog—recently were told of a “dramatic breakthrough” in the control of automobile exhaust fumes. The device, an exhaust manifold afterburner developed jointly by Chrysler Corp. and Thompson Ramo Wooldridge, Inc., was cited in terms that made it sound like a proven panacea. Anticipated price was quoted at about \$125 for V-8s and less than \$100 for sixes. The result was a hue and cry for a California state law to make anti-smog devices required equipment for all cars, starting with 1961 models.

The facts:

The Chrysler-TRW device shows “great promise,” according to officials of both companies. More testing and development needs to be done. The afterburner so far is strictly in the prototype stage and has not been tested in vehicles on the road. There is no assurance that it can be sold for \$125 or less. Much cost-engineering work remains before a firm price can be fixed.

Other auto companies and accessory manufacturers have had exhaust-control projects under way for some time, too. Some are studying various types of afterburners; others are working on catalytic mufflers. A few of these programs are almost as advanced as the Chrysler-TRW project, although Chrysler feels it is closest to the right track. It should know, too, because the entire anti-smog campaign is being handled on a very cooperative basis by the industry.

Meanwhile, barring a sudden breakthrough in smogless exhausts, a much simpler device to control crankcase-vapor pollution will be ready first. Californians should be able to buy them on 1961 American cars. Simple piping and valves feed “blowby”—unburned gasoline fumes—from the crankcase back to the cylinders. There it's burned instead of being vented to the outside where, scientists discovered recently, it's a substantial part of vehicle emissions.

**“Shoe shine” for your old chrome.** Now you can slap a fresh coat of synthetic “chrome” on the rusted brightwork of your car—if you're a Chevrolet dealer. Chevy service technicians

CONTINUED



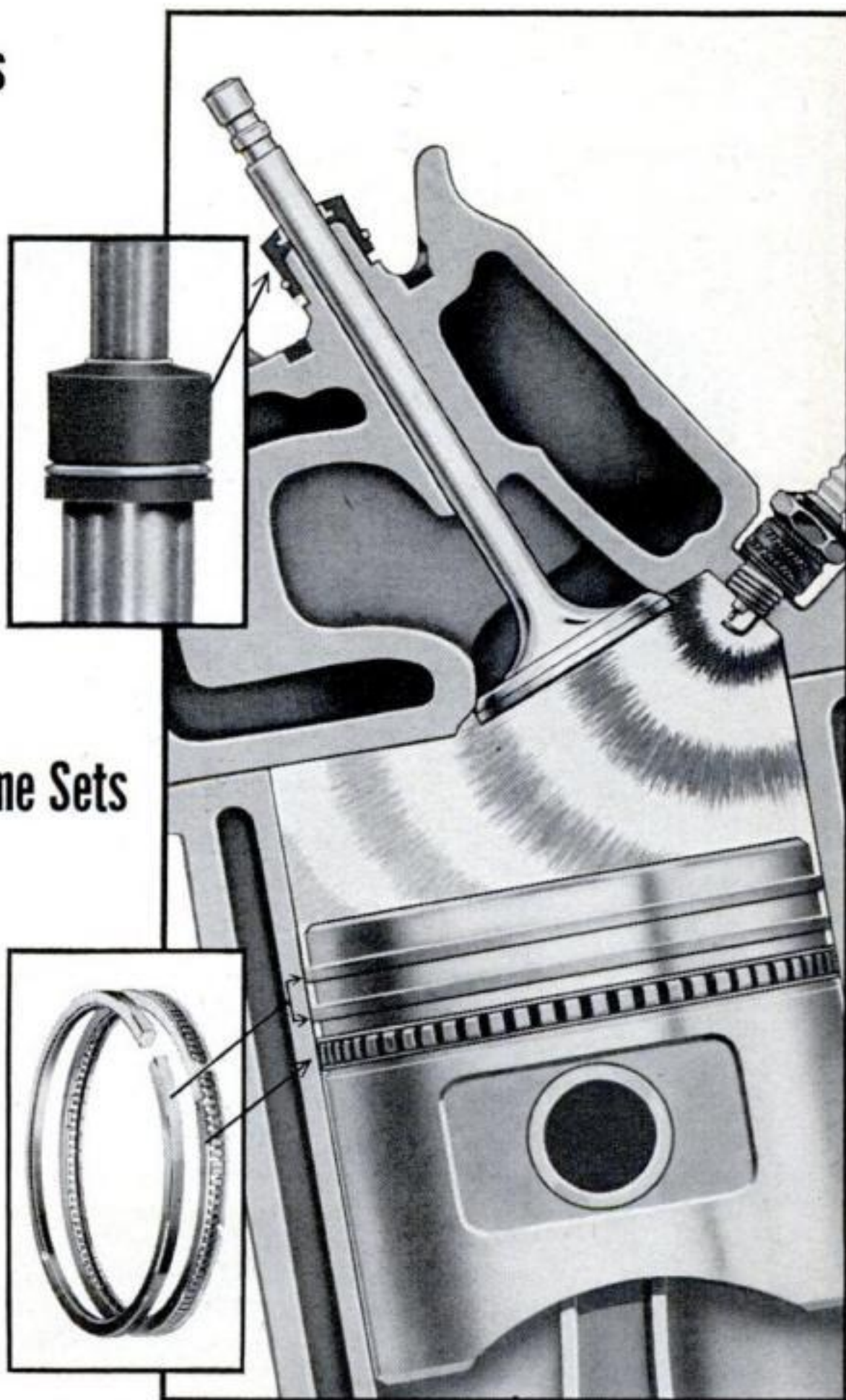
# Only Perfect Circle gives you **2-WAY POWER PROTECTION!**

## **1. Perfect Circle Valve Seals**

**solve problem of excessive oil consumption past valves!**

New rings and restored valve efficiency produce higher compression pressures—and higher deceleration vacuum. Increased vacuum draws oil through loose and worn valve guides. Stop this loss with *new* Perfect Circle Valve Seals!

**For best performance**, valve or ring jobs should include installation of Perfect Circle Valve Seals. The cost is surprisingly low.



## **2. Perfect Circle 2-in-1 Chrome Sets**

**solve problem of excessive oil consumption past pistons!**

2-in-1 Chrome sets provide the finest piston rings obtainable! Top rings and oil rings are plated with thick, solid chrome that doubles life of cylinders, rings, pistons. No tedious break-in is necessary, rings are pre-seated at factory.

**For best performance** install 2-in-1 Chrome sets for thousands of extra miles of power protection and positive oil control!

# PERFECT

**PISTON RINGS**



# CIRCLE

**POWER SERVICE PRODUCTS**

Hagerstown, Indiana

In Canada: Don Mills, Ontario



have developed a synthetic material that simulates the appearance of chrome. It's wiped on worn and corroded bumpers, grilles, and other bright metal surfaces, then rubbed in—literally “shoe shining” it into the surface.

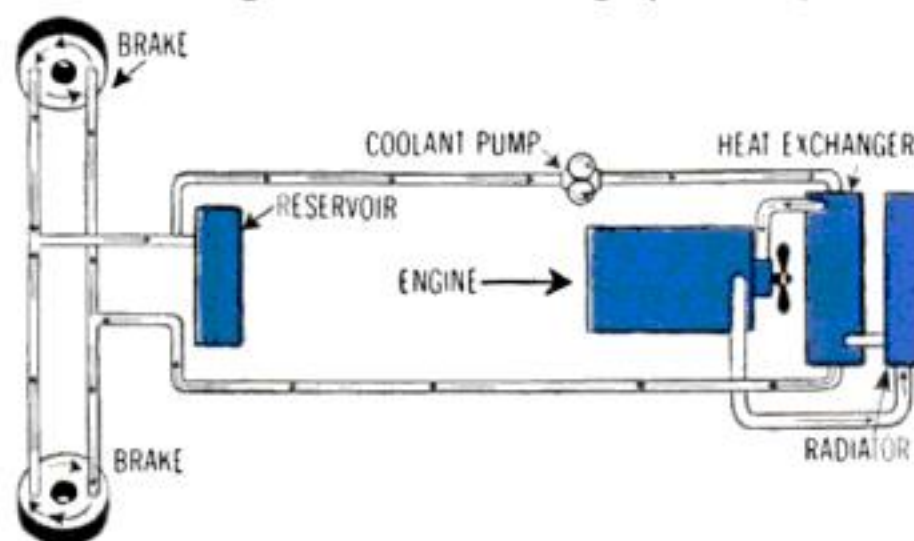
Tests reportedly have proved the application durable and remarkably comparable to the original chrome finish. Cost is just one-tenth that of a chrome replating job.

The rub? The process so far has been released only to Chevy dealers for reconditioning used cars.

**Oil cools new truck brakes.** Get oil in normal brakes and you're in trouble, but a new brake-retarder for trucks is filled with oil all the time—to get rid of fade-causing heat. The Auto Specialties Manufacturing Co. of St. Joseph, Mich., builder



Oil-cooled brake.



of disk brakes and clutches, makes the new multiple-disk brakes. They have sintered-metal linings that will last up to 300,000 miles, says the company. The brakes are lighter than standard air brakes and require little maintenance because an automatic adjuster compensates for lining wear.

Besides normal braking service, the new brakes can be used to retard speed on steep downgrades. The company reports that a series of 10 test stops, which left a conventional drum-braked truck without adequate stopping power due to excessive fade, produced absolutely no fade in a similar truck with the new oil-filled disk brakes.

**A Rambler convertible for 1961.** This is part of American Motors' program to keep sales momentum rolling in the face of Big Three compact-car competition. Also, the English-built Metropolitan line may be expanded to include more models—like station wagons and two-door sedans. Some engineering changes for the Metro might also be on the way. This finding and filling of chinks in the market left by the Big Three is an American Motors specialty.

**Compact trucks coming.** Look for scaled-down truck versions of some of the new compact cars. Ford will offer a Falcon pickup truck, probably late this spring, and reportedly has a panel delivery model on the drawing boards. Chevy is considering a light truck using the air-cooled Corvair engine. If it appears, it will be boxy, not unlike the VW trucks.



# **Build a Liberty Home Yourself WITH NO FINANCING PROBLEMS**

SAVE AS MUCH AS  
**\$5000**



## **IF YOU CAN DRIVE A NAIL, YOU CAN BUILD A Liberty HOME!**

Beat high building costs . . . and have an outstanding home, too. The revolutionary, new Liberty Ready-Cut method gives you a beautifully designed home . . . **EASY TO ASSEMBLE** . . . at unbelievably low cost. Everything is precision cut for exact fit . . . saving days of costly labor. You receive all framing and finish lumber, assembled windows, pre-fit mortised doors, oak flooring, insulation, self-sealing roof shingles, nails, paints, hardware, plus complete building plans and instructions.



THE MANCHESTER

## **ONLY WITH A Liberty Ready-Cut Home CAN YOU GET ALL THESE EXCLUSIVE BUILDING SERVICES**

**UNCONDITIONAL GUARANTEE**—Your Liberty Home is covered by an unconditional guarantee for quality, quantity and soundness of construction.

**FINANCING NO PROBLEM**—Liberty Homes are approved by Banks and Savings and Loan Associations everywhere. Acceptable for FHA and VA financing.

**SOLD DIRECT TO YOU**—Liberty has no salesmen. You buy direct and save sales commissions. You make your own decision without high pressure tactics of any kind.

**78 DESIGNS**—For 1960 Liberty offers the most beautifully designed homes in America today with unlimited floor plan variations to fit your specific needs.

### **LIKE TO VISIT A LIBERTY HOME?**

Over 25,000 Liberty owners are thrilled with their homes—and there is one near you . . . just ask us for the address.

- **SAVE \$5000**—You save on material cost, labor cost, contracting fees. You eliminate all middleman's profits, architect's fees and costly material waste.
- **100% QUALITY**—Only materials of unquestioned quality are used. All lumber is kiln-dried. Your home will last a lifetime.
- **FREE CONSULTATION**—The Liberty way is the foolproof way. However, if a problem of any kind arises during construction, Liberty's building consultants are ready to help you day or night without obligation.

*Priced from \$3700 . . . Freight Prepaid*



### **FIND OUT ABOUT THE MOST SENSATIONAL HOME BUILDING OPPORTUNITY IN AMERICA TODAY**

Clip this coupon. Mail it with 25c for your  
**BIG** full-color catalog.

Mail to LIBERTY HOMES  
1302 Lafayette Avenue, Bay City, Michigan

NAME \_\_\_\_\_  
ADDRESS or RFD \_\_\_\_\_  
CITY \_\_\_\_\_ ZONE \_\_\_\_\_ STATE \_\_\_\_\_



**No. 1 in POWER**  
**No. 1 in PERFORMANCE**  
**No. 1 in RELIABILITY**  
**No. 1 in FUEL ECONOMY**  
**No. 1 in ENGINEERING**  
**No. 1 in STYLING**  
**No. 1 in FEATURES**  
**No. 1 in SAFETY**  
***and No. 1 in SALES***

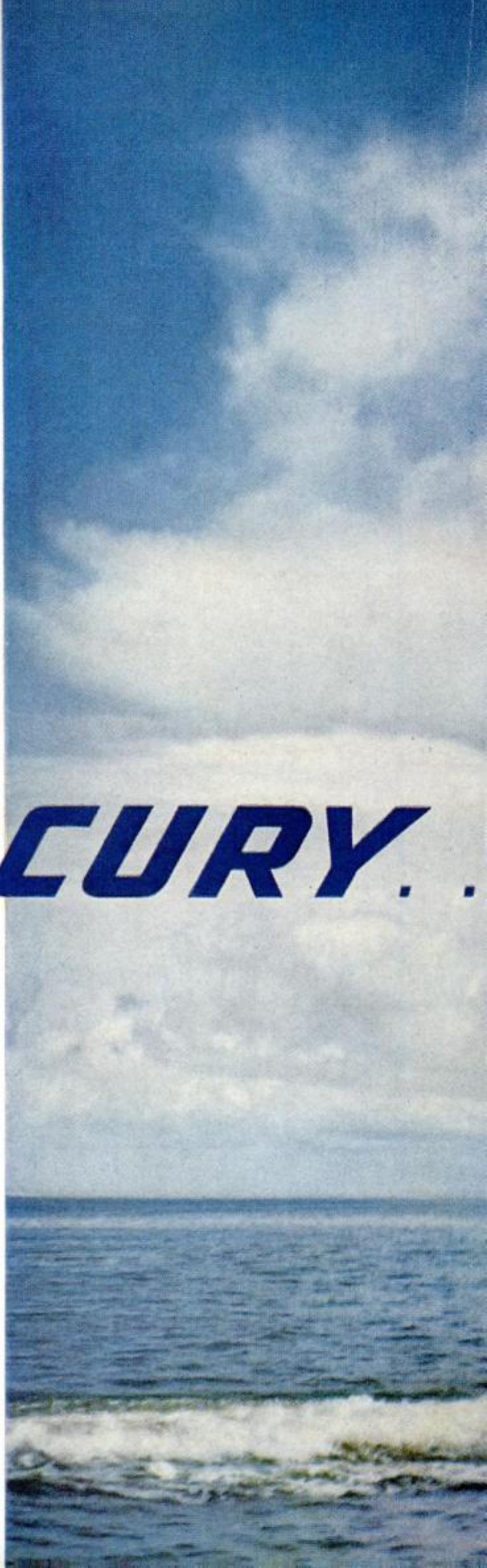
# ***MERCURY...***

**Featuring the World's Most Powerful  
Family Outboard...80 hp *merc 800***

*See the 1960  
Mercury line...  
6 to 80 hp...at  
this sign of  
friendly service.*



Write for Free catalog.  
© 1960 KIEKHAEFER CORP.,  
FOND DU LAC, WISCONSIN





***... IS THE WORLD'S NO. 1 OUTBOARD!***





# Get satisfying flavor...so friendly to your taste!

NO FLAT "FILTERED-OUT" FLAVOR!

NO DRY "SMOKED-OUT" TASTE!



Never too strong.  
Never too weak.  
Always just right!

*You can light either end!*

**See how** Pall Mall's famous length of fine, rich-tasting tobacco travels and gentles the smoke—makes it mild—but does not filter out that satisfying flavor!

**HERE'S WHY SMOKE "TRAVELED" THROUGH FINE TOBACCO TASTES BEST**



**1** You get Pall Mall's famous length of the finest tobaccos money can buy.



**2** Pall Mall's famous length travels and gentles the smoke naturally . . .



**3** Travels it over, under, around and through Pall Mall's fine tobaccos . . . and makes it mild!

**OUTSTANDING...and they are MILD!**

© A. T. Co. Product of *The American Tobacco Company*—"Tobacco is our middle name"



**Electric cars coming? Cheap electricity from fuel cells may make them practical**

# Electric Tractor Makes Its Own Juice

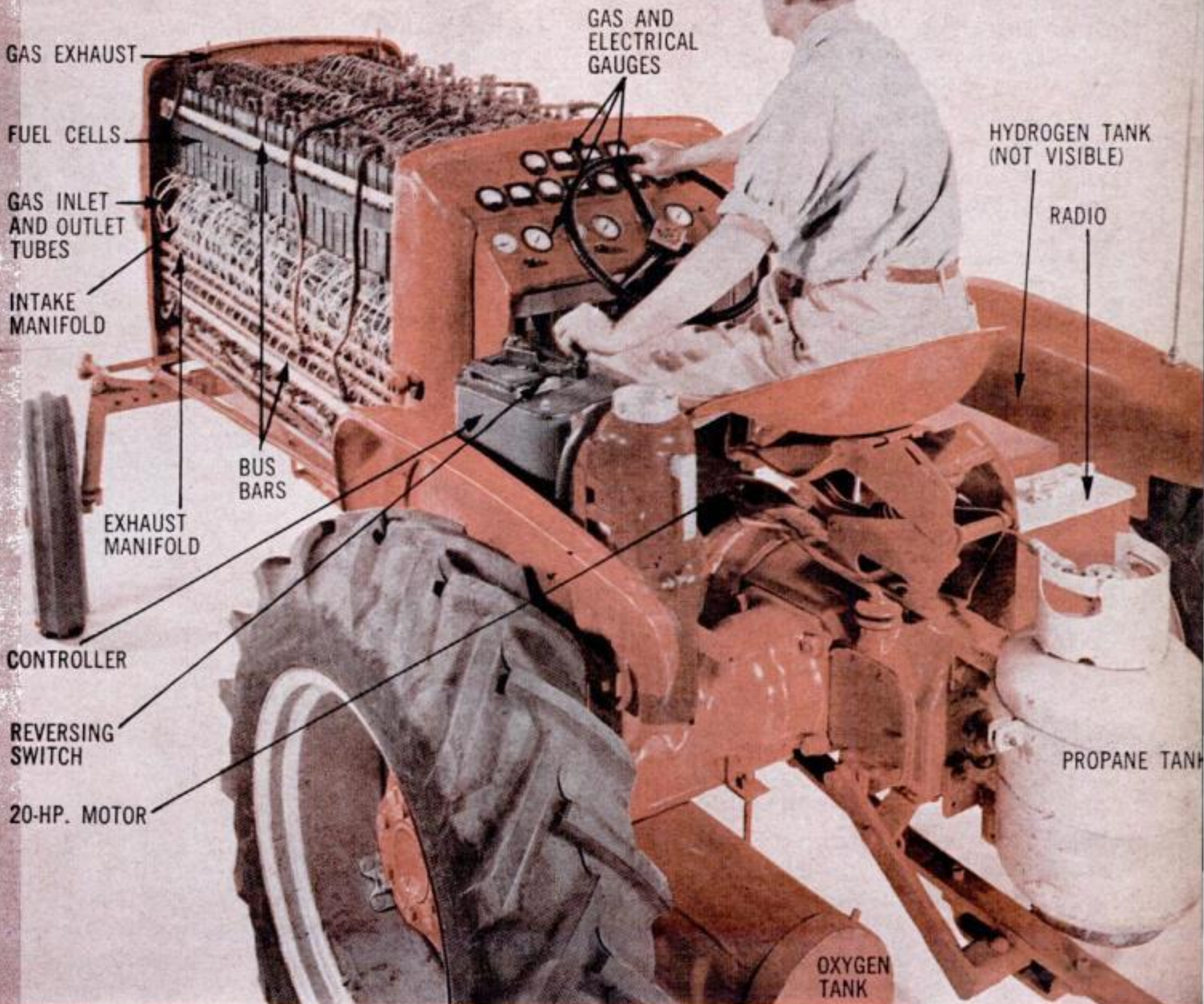
**By Martin Mann**

**T**HE bright orange tractor plowed Wisconsin loam while its driver listened to the radio. That was what struck you first—the radio. Many farm tractors make so much noise you'd

never hear a radio. But this machine was eerily silent. If you listened closely, there was the discreet whine of an electric motor.

This was an electric tractor, all right. Under its hood were superefficient batteries, a strange new kind that never

**GAS TO ELECTRICITY:** Cells keep making power as long as they are supplied with fuels (from tanks). Notice trolley-car speed control.



CONTINUED

69





**Under this hood  
there's nothing  
but fuel cells**

**FLEXING ITS MUSCLE—**3,000 lb. at drawbar—electric tractor pulls multiple-bottom plow through hard, dry earth. Tractor was a stunt, but factory trucks will be built for sale.

burns out. They are putting electric transport back on its wheels: A factory truck is in the works now, and electric cars, after a generation in the engineering attic, suddenly look very, very appealing.

But that's not all. The whole business of making and using electricity is in for a shakeup. These batteries are man-size power in small packages. They're ideal for any job off the power lines: camp sites, military outposts, space satellites. They might even eliminate the power lines altogether—a furnace-size unit to supply your house may be on sale by 1965.

To trigger an upheaval like that, the new batteries have to be something special. They are. They're called fuel cells. They make electricity the same way flashlight cells and auto batteries do, from a reaction between chemicals. The difference is that the chemicals are not stored inside the cell, but are supplied through pipes from outside. Fuel cells keep on generating power as long as you keep feeding in the chemicals.

One chemical is oxygen (ordinary air is okay, but less efficient). The other is a fuel such as hydrogen (the best), propane cooking gas (used in the tractor), gasoline, or alcohol. A catalyst inside the cell makes the fuel combine with oxygen without actually burning. Energy is released, not in the form of heat, but as electrons that get pushed out the electrode and into the wires: an electric current.

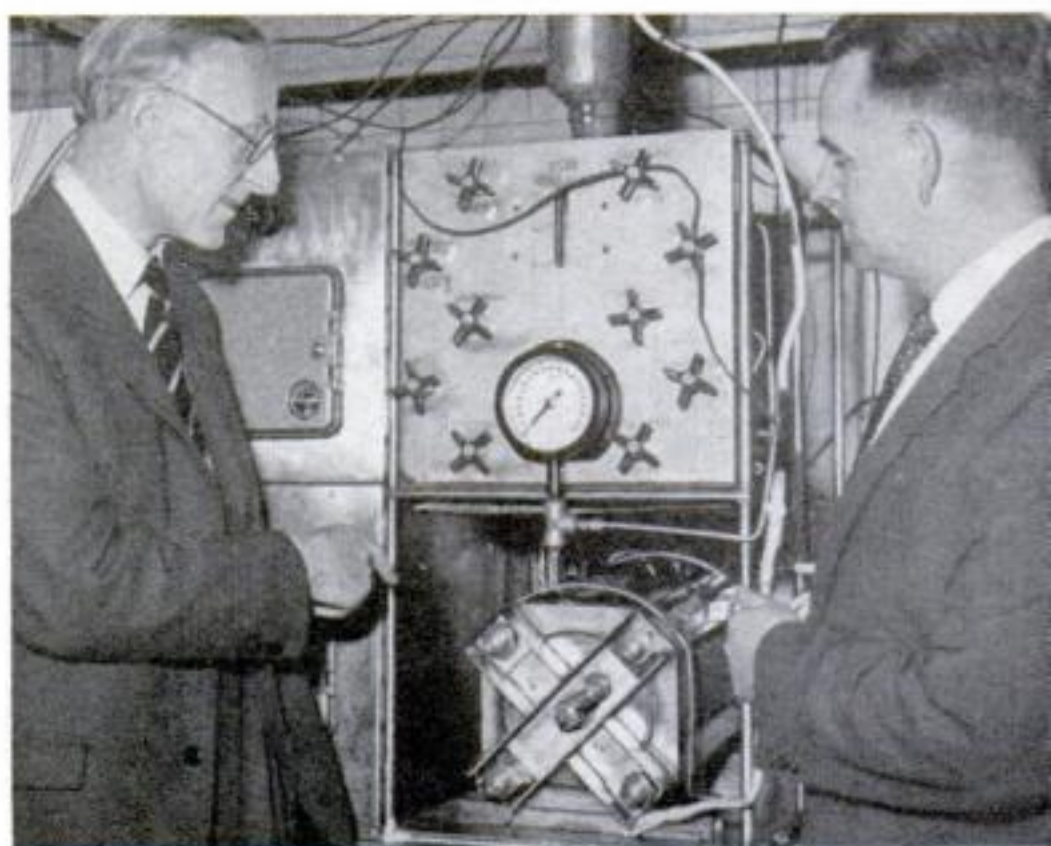
What's so wonderful about this is that it ties into one package most advantages

of gasoline power and electric power, and kicks out most of their disadvantages. Here's a quick rundown:

- Plenty of power is available. The tractor pulled 3,000 pounds at the drawbar, ample for a multiple-bottom plow. It carried a standard 20-horse DC motor, supplied by four banks of fuel-cell batteries that weighed about a ton and filled the normal engine space. Another type of fuel-cell battery generates 20,000 watts, yet is only as big as a tank-type vacuum cleaner.

- They're cheap to run. Unlike dry

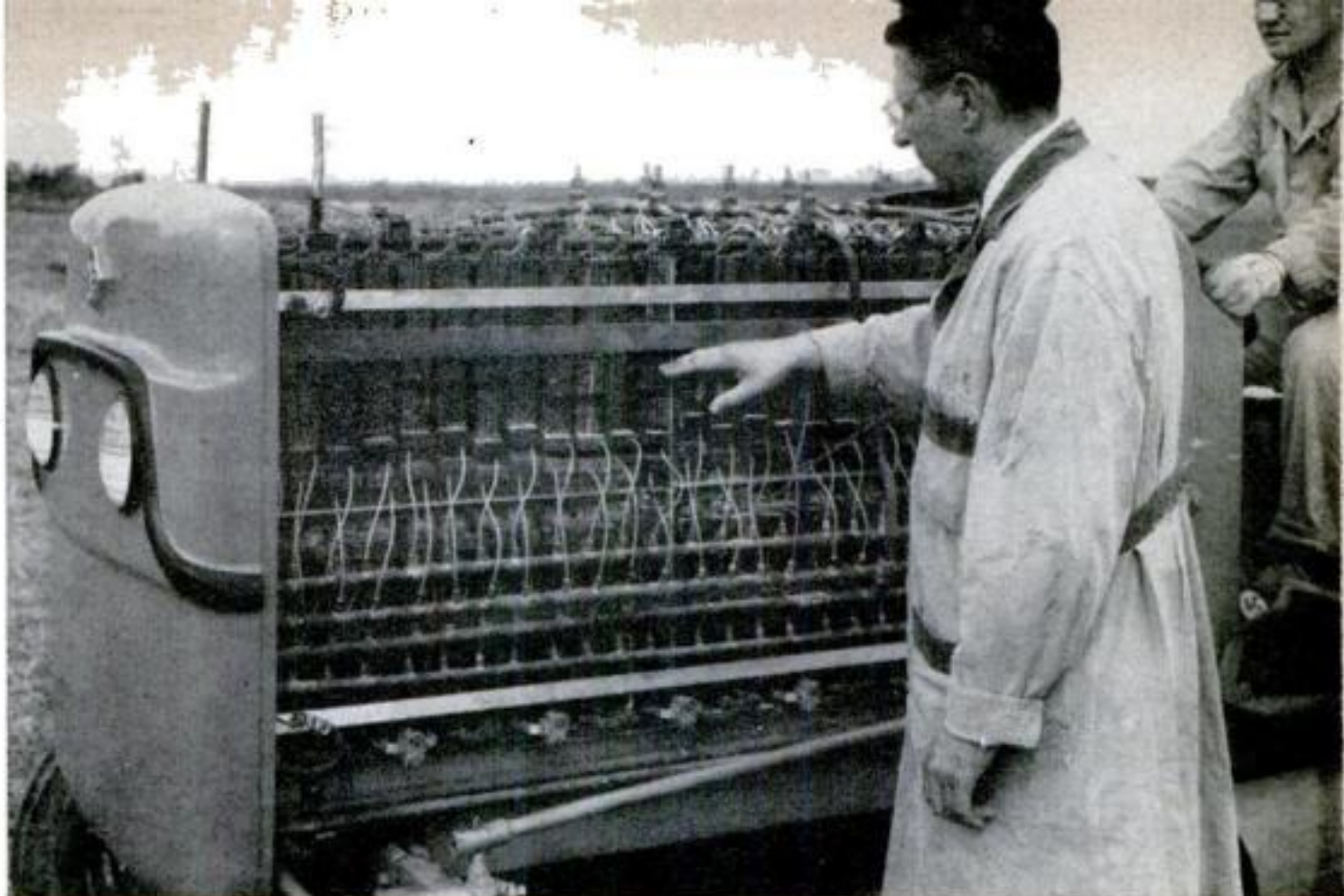
### **British version of fuel-cell**



**INVENTOR BACON** (left) shows his battery to Dr. H. H. Chambers, designer of another type that uses cheap fuel at high temperatures.



**1,008 CELLS**—assembled into 112 batteries, nine cells to a battery—are needed to generate 15 kilowatts DC for the tractor. Bus bars (bright metal strips) carry the juice to the controller and then to the motor—a standard 20-horse model. The tractor runs about three hours before the gas tanks empty and have to be replaced—a simple job.



cells, which consume expensive zinc, fuel cells use up common stuff—propane already powers many taxis, and hydrogen is now mass-produced. Unlike storage batteries, fuel cells need no recharging—you just hook on fresh tanks, with no more trouble than gassing up a car.

- They're efficient. Theoretically, fuel cells can convert every bit of the chemical reaction's energy into usable electric power: 100-percent efficiency. Actual cells already built run around 75 percent. Today's best engines (steam, gasoline, or diesel) never do better than about 40

percent. Engines are doomed to mediocre efficiency by the laws of thermodynamics, which don't apply to fuel cells.

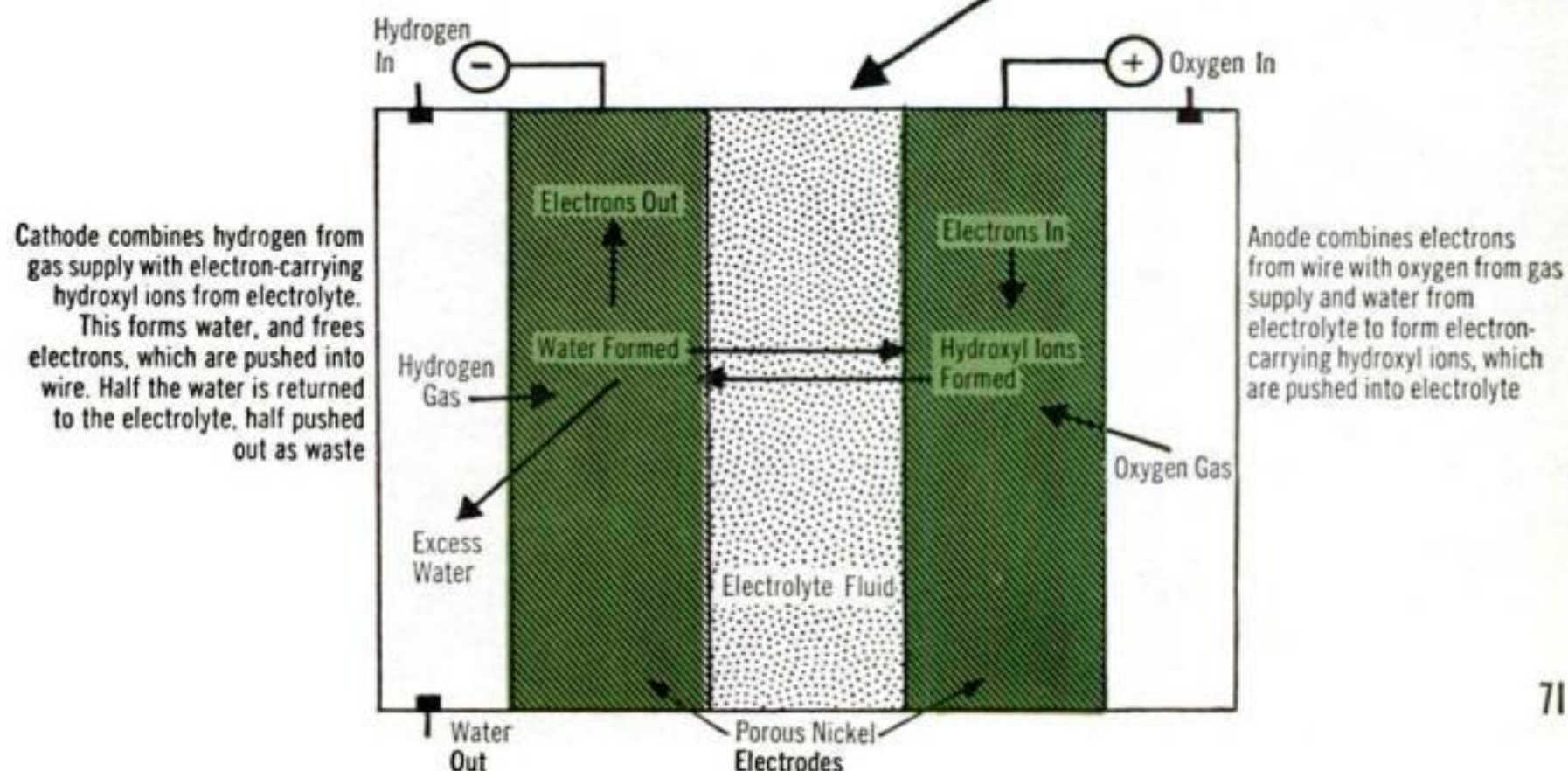
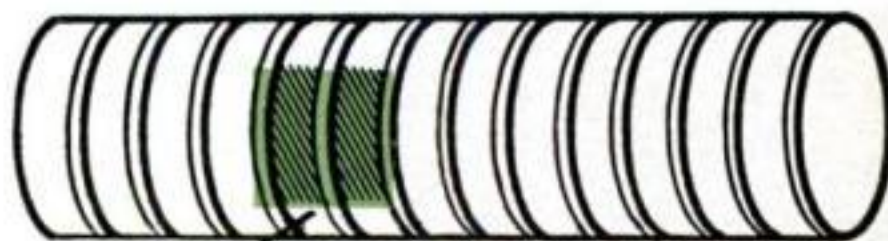
- They're civilized. Fuel cells are quiet (there's a gentle whoosh of gases, barely noticeable), they don't foul up the atmosphere (the exhaust is water plus; in the case of carbon-containing fuels, harmless carbon dioxide), and they can start pouring out juice the instant you open the valves.

Why didn't somebody think of this before? A lot of people did. Sir William

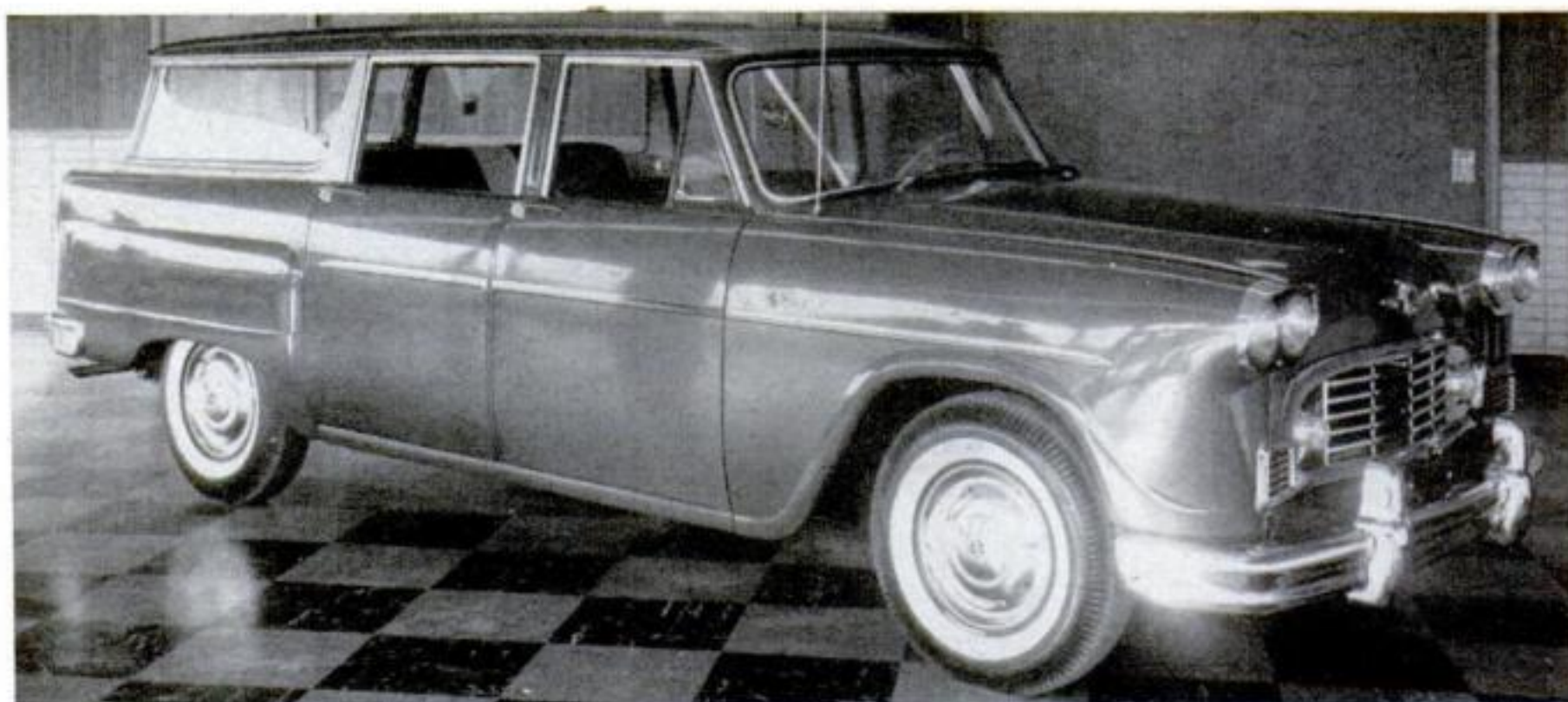
*[Continued on page 250]*

## **battery will furnish auxiliary power in U.S. Air Force planes**

**COMPACT, POWERFUL BACON UNIT** demonstrates principle of all fuel cells. Fuel combines with oxygen in steps, so that little heat is generated, but electrons are released. Unlike the Allis-Chalmers device, the Bacon cell requires heat, pressure, and pure hydrogen fuel.







## WAGON AND SEDAN ARE PRIVATE TAXIS

The company that makes the familiar Checker taxicab is now manufacturing sedans and station wagons for the general public. Two feet shorter and five inches narrower than current Chevrolets, Fords, and Plymouths, the Superba, as Checker

calls it, comes powered with either an 80-hp. L-head or a 122-hp. overhead-valve engine.

The station wagon's roomy cargo compartment is 109 inches long, 58.7 wide, and has a maximum height of 33.6.



**SELF-FUELER.** Refueling from a supply inside four five-foot-diameter "tires" towed behind, the M48A2 tank at left multiplies its range by more than seven times. Each of the big rolling units on the transporter adds 500 gallons to the vehicle's tank.



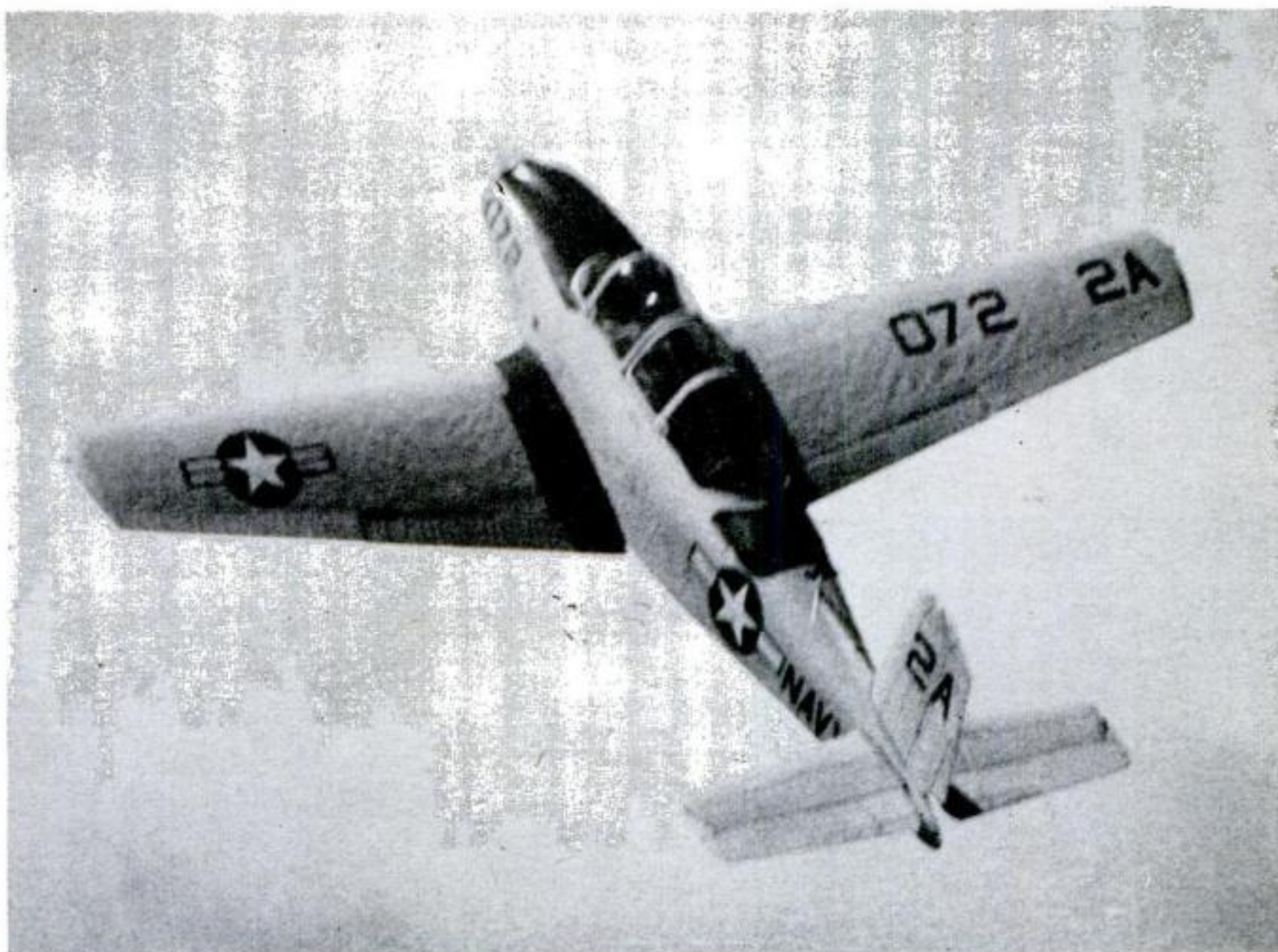
Little car connects islands. Pull chains on roof operate motor, change direction of travel.

## ISLAND DWELLERS COMMUTE BY CABLE CAR

Living on a tiny islet in Hamilton Sound, Bermuda, can be fun. The Bronson Hartleys installed a cable car to the main island to transport people and gro-

ceries. The car rides on a 137½-foot cable. Controls inside operate an electric motor on the islet. A bell hung from the bottom tinkles on landing.

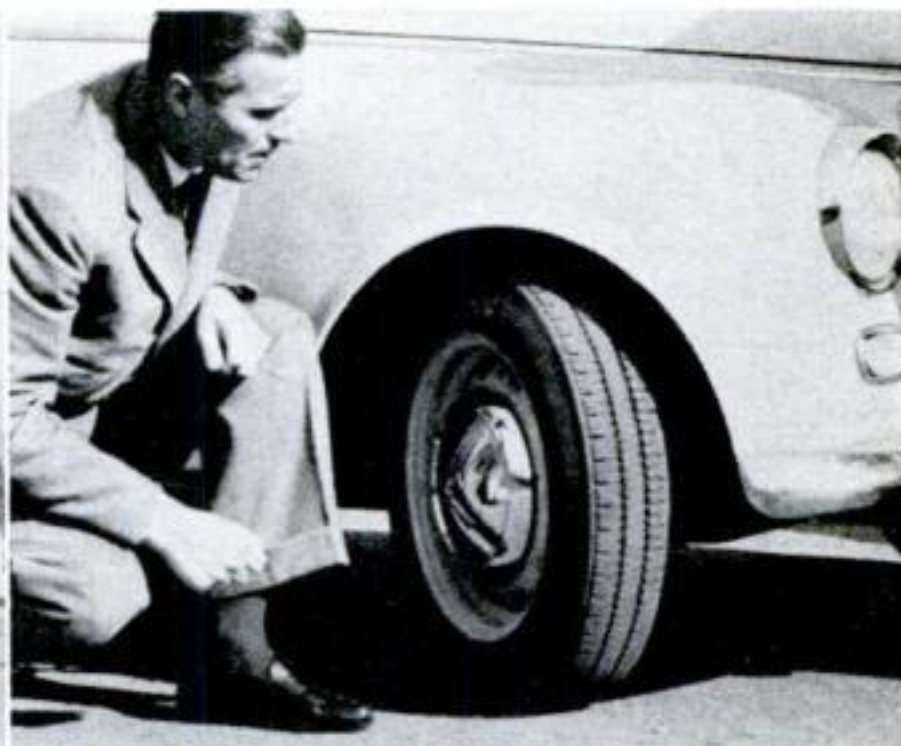
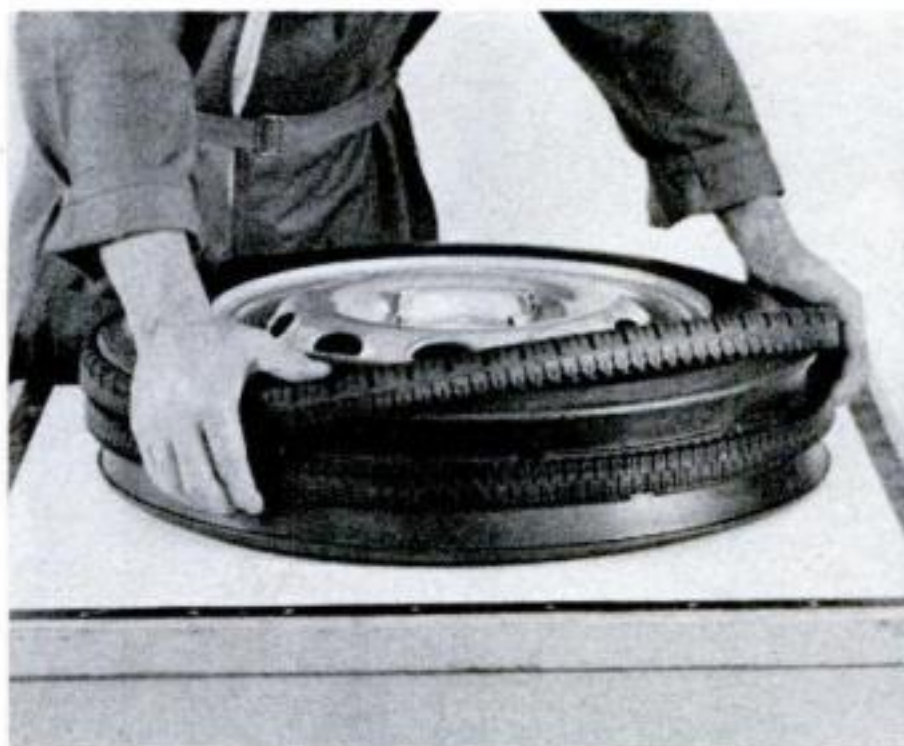




## STRESSES PUT CRINKLE IN PLANE WINGS

This unusual photo shows the wrinkled skin on airfoils of a Navy Beech T34B trainer during a hard pull-up. Catching the action of stresses on film called for a

triple play: a high-gravity pull-up, sun rays falling at a low angle on the wings, and the snap of the camera shutter at precisely the right instant.



Treads ease on deflated casing without tools . . . . . fit snugly into grooves and won't slip.

## REPLACEABLE TREADS INCREASE TIRE LIFE

Here's a new tire that has treads you can replace when worn, shift for rotation, or change to fit the season. The separate treads—three rubber bands—stretch over

the casing and lock into place. Pirelli of Milan, Italy, makes the tire. Interchangeable winter treads can be fitted with spikes for use on ice.





**P**OPULAR SCIENCE here presents the second of three articles on Detroit's new compact cars.

Last month we told you what we had found out about the Chevrolet Corvair in 10,000 miles of driving. This month we give you the results of our 10,000 miles in a Ford Falcon. We drove through 21 states and into northern Mexico, in fair weather and foul, over good roads and bad. Next month: 10,000 miles in a Chrysler Valiant.



No other magazine has ever attempted 30,000 miles of driving in a period of three months to collect detailed information on how new cars behave in everyday service.

Like the Corvair, the POPULAR SCIENCE Falcon was purchased at its full retail price from a regular dealer. It was a manual-shift, two-door sedan, with only a heater and radio as accessories.

## HOW THE FALCON DID

### THE PERFORMANCE

Total distance covered . . .	10,780.7 miles
Gasoline used (non-premium) . .	405.9 gal.
Average miles per gallon . . . .	26.56
Oil burned . . . . .	1 qt.
Gas mileage at constant speeds	
30 m.p.h. . . . .	30.2 m.p.g.
40 m.p.h. . . . .	29 m.p.g.
50 m.p.h. . . . .	28.1 m.p.g.
60 m.p.h. . . . .	27.1 m.p.g.
Gas mileage in stop-and-go driving . . . . .	22.4 m.p.g.
Acceleration	
0-60 m.p.h. . . . .	22.9 seconds
40-60 m.p.h. . . . .	13 seconds
50-70 m.p.h. . . . .	16.5 seconds

Top speed . . . . .	78 m.p.h.
Speedometer error	
Indicated Speed	Actual Speed
40 m.p.h. . . . .	38 m.p.h.
50 m.p.h. . . . .	48.5 m.p.h.
60 m.p.h. . . . .	57.6 m.p.h.
70 m.p.h. . . . .	68 m.p.h.

### THE COSTS

Gasoline . . . . .	\$131.12
Oil burned . . . . .	.50
Gas-oil cost per mile . . . . .	.0122
Repair and maintenance, including adjustments at 500, 1,000, 5,000, and 10,000 miles	
Oil and filter changes . .	\$9.83
Lubrication . . . . .	3.00
New points . . . . .	1.95
Total labor . . . . .	12.75
Total . . . . .	27.53
Overall direct operating cost per mile .0147	





# Testing the Ford's compact little brother:

## 10,000 MILES IN A FALCON

**F**OR more than a quarter of a century, U. S. motorists—including you, maybe—have badgered the Ford Motor Co. with the question: “Why don’t you bring back the old Model A?” Well, it has. Only now, the car has another name. Ford calls it the Falcon.

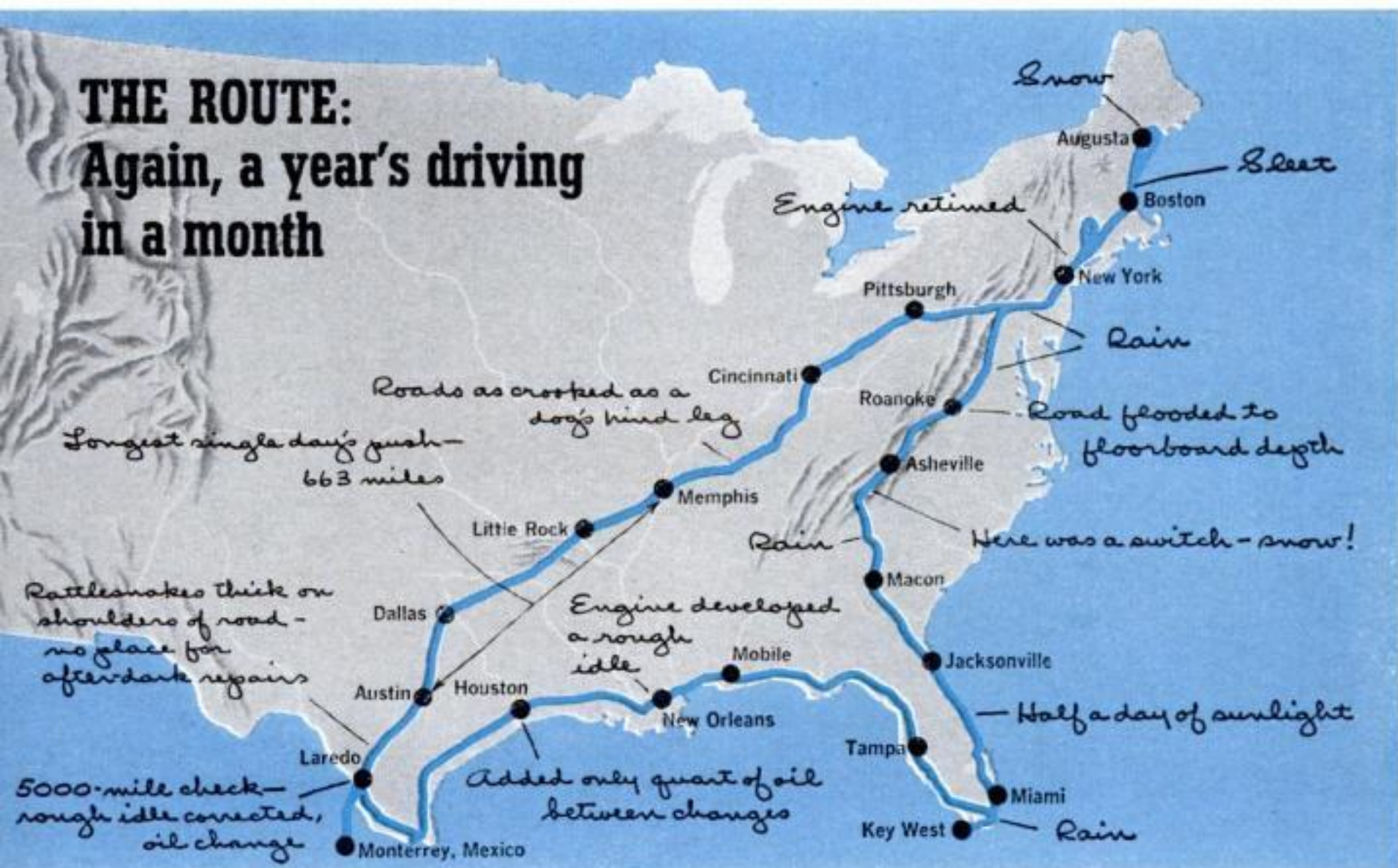
Its ride is not so very different from the old Model A’s. It drives pretty much

like the old Model A. It weighs just about what the old Model A did, and accelerates much like it.

But there the comparison ends. The Falcon is a couple of feet longer, five inches wider, and almost five inches lower. It has six cylinders instead of four, and more than twice the horsepower. It goes considerably farther on a gallon

### THE ROUTE:

Again, a year’s driving  
in a month



CONTINUED



## How the Falcon Compared with the Corvair

	FALCON	CORVAIR
Overall average miles per gallon	26.56	23.43
Gas mileage at constant speeds		
30 m.p.h. ....	30.2 m.p.g.	26.6 m.p.g.
40 m.p.h. ....	29 m.p.g.	24.2 m.p.g.
50 m.p.h. ....	28.1 m.p.g.	23.6 m.p.g.
60 m.p.h. ....	27.1 m.p.g.	22.6 m.p.g.
Miles per gallon in stop-and-go driving	22.4 m.p.g.	21 m.p.g.
0-60 acceleration	22.9 sec.	17 sec.
Top speed	78 m.p.h.	88 m.p.h.
Total oil consumption	1 qt.	4 qt.
Gas-oil cost per mile	\$.0122	\$.0145
Overall direct operating cost per mile	\$.0147	\$.0184

of gas. And it costs four times as much.

Members of the POPULAR SCIENCE staff turned up a bookful of facts and opinions on the Falcon. They put calipers on each facet of its operation. The ground they cover below includes gas mileage, handling, ride, performance, design, comfort, styling, and conclusions.

On two virtues of the Falcon there was no arguing with the facts: It was economical on gas and oil, and it ran those 10,000 miles without a mechanical breakdown. On other points—as you'll soon see—the reactions varied widely.

### The Gas Economy

*Henry Comstock:* I made up to 663 miles a day. My average was 556. Yet on only three days out of 14 did I have to stop for gas more than twice—on an 11-gallon tank!



*Falcon sped along at top speed limit on superhighways like this. Delaware Memorial Bridge is in background.*

*Hubert Luckett:* For 300 miles of commuter-type driving, I got 28.2 miles per gallon. For 152 miles of highway driving, including numerous hard acceleration trials, the Falcon registered 26.3.

*Howard Allaway:* I can beat that. My average on the parkways, where the speed limit is 40 to 50, was 28.3.

*Frank Rowsome:* The gas mileage varies a lot, of course, with the type of driving. On one 760-mile day, driving so hard that I averaged 50.7 miles an hour—including time out for gas—I got 21.6. When I took it easier, it jumped to 25.6.

*Allaway:* That's exactly what I got on a long weekend of fairly hard driving.

*Comstock:* Maybe my overall average will be a better clue. I covered almost 6,500 miles going to Mexico and back. That included a lot of city driving at peak traffic hours in New Orleans, Jacksonville, Miami, Tampa, Mobile, Houston, San Antonio, Dallas, Little Rock, Memphis, Cincinnati, and Pittsburgh. I averaged 26.5 miles to the gallon. I got 29 to 30 at road speeds of 50-55, with frequent drops to 25 m.p.h. through towns.

*Devon Francis:* It wouldn't surprise me if gas station owners declared the Falcon illegal. The Chevy Corvair can't match it for economy.

### The Handling

*Rowsome:* The handling is fair. The car heels and jitters on hard corners.

*Luckett:* Not in my book. The handling on twisting, curving mountain roads was exceptionally good. Heeling on turns is slight, and the road-holding ability ex-





*Gassed up, the Falcon first crossed Mexican border at Reynosa.*



*Mountain switchbacks north of Monterrey proved a rugged test.*



*It had to share bumpy roads with burro-drawn wagons on round trip into Mexico.*

cellent. The car has a good sense of direction.

**Martin Mann:** I found that the Falcon takes sharp curves flat at high speed. It makes time beautifully on twisting, crowned mountain roads.

**Allaway:** I felt more at ease in hard-driving traffic than in the standard-size car that I drive every day. The car stays flat on turns.

**Lockett:** It's decidedly wind-sensitive at high speeds.

**Rowsome:** Yes, I was about to say that. Moreover, the steering is slow and a little numb. But there's little road shock, and the wheel unwinds on release. Parking takes a lot of wheel spin.

**Francis:** You mean, wheel tug. My wife complained about that. The car isn't up to the Corvair in handling. Mark me down for excessive wheel road-shock.

**Comstock:** Mark me down for liking the roadability. The car stayed glued to the pavement.

## **The Ride**

**Mann:** The ride is gentle.

**Francis:** Not compared with the Corvair's, by any means. I found it as stiff as a shirt on a clothesline at Christmas.

**Rowsome:** That's an exaggeration. The ride's a bit harsh, with some pounding and thudding. I got noise and shock on some concrete expansion strips. Oddly

## **How the Falcon's Tires Stood Up**

A tire expert measured tread depth at 10,780.7 miles. Since the 6.00 x 13 Goodyears had not been switched at 5,000 miles, four instead of five tires shared all the wear. Each left-side tire had lost 30 percent of its tread, right-side tire 35 percent. High-crowned roads, the expert said, accounted for the difference. His estimate of projected tire life: 33,000 miles on four tires, or 41,000 on five switched.





*New M-60 tank provided contrast in size at Army's Aberdeen Proving Ground.*

enough, the ride isn't bad on rough roads if they're taken fast.

*Allaway:* I'd say the ride is fair-to-good. I did find some pounding and instrument-panel chatter and buzz on bricks and washboard.

### **The Performance**

*Rowsome:* This car's big drawback is its 3.1:1 rear-axle ratio.

*Comstock:* With the Falcon, you have to go back to your driving habits of 20 years ago. At first, it's a chore to down-shift in traffic—high is not a traffic gear.

*Rowsome:* Neither is high in the Corvair.

*Francis:* Yes, but the Corvair accelerates better.

*Mann:* The lack of torque is annoying in traffic and in starting up a hill. But I got used to the frequent shifting.

*Allaway:* That was my main complaint. The Falcon ran out of steam on long hills, especially in 35-40-m.p.h. zones.

*Rowsome:* It doesn't pass well up to 45 or 50 m.p.h., and it's almost a public nuisance on long, steep highway climbs.

*Comstock:* That's funny. I found the acceleration lively up to 55 or 60, once I got rolling. Low gear did annoy me. It isn't synchronized. You have to be good

at double-clutching to shift to low while you're under way—or take back-talk from your dentures.

*Rowsome:* When I drove the Falcon, it didn't seem right. It had gone some 8,000 miles and needed tuning.

*Luckett:* The engine obviously needed sharpening up when I took over right afterward. It was blubbery in second gear, and in high the engine was rough when I accelerated in the 40-60 range. I got the plugs cleaned, and nudged the timing from two to six degrees before top dead center. Doing this shaved three seconds off the 0-60 time.

*Francis:* On performance, just let me say that the Falcon has no really bad habits, and that the axle ratio degrades its good ones.

### **The Design and Controls**

*Allaway:* The Falcon has a familiar feel and sound. The engine is up front. The shift is on the steering column.

*Comstock:* I suppose we could quibble indefinitely about the Falcon's shortcomings. The vacuum-powered wiper blades do a minimum job when the throttle's open. But I found that mechanics and amateur car buffs liked the Falcon's uncluttered engine compartment.

### **How Well Was It Designed and Built?**

The Falcon is, in general, a well-designed and well-assembled automobile. But all cars have their faults, and the Falcon is no exception.

The springing is somewhat harsh.

The wind-wander is excessive in strong cross-gusts.

The driver's seat has insufficient travel for short legs, and the steering-wheel spokes fret long legs.

Control knobs on the panel could be dangerous in a collision.

When down, the left sun shade interferes with sight in the rear-vision mirror.

The standard rear-axle ratio is heavily biased in favor of fuel economy, at the cost of performance.

A number of under-dash rattles, and noise in the speedometer, developed.

Assembly quality was fair to good. But a need for excessive accelerator pressure in the upper speed ranges turned out to be interference with the linkage by a badly positioned heater hose.



*Francis:* The panel design, with its projections, is a potential danger in a crash or even a panic stop.

*Luckett:* You're not giving the Falcon its just due. For instance, the engine starts quickly after a cold, wet night at the curb—provided the manual choke is used intelligently. (Why is it that women can't learn that?) The clutch action is smooth and easy.

*Mann:* But the clutch and brake pedals are too small and too close together—almost as bad as the Volkswagen. Every time I hit the clutch, my foot got tangled up with the left fresh air vent.

*Rowsome:* I'd say the brakes and transmission are fine.

*Allaway:* The push-pull controls are pleasantly simple except for the wiper knob, which twists. Why couldn't that be push-pull, too?

*Luckett:* That is quibbling. The transmission and engine are quiet. That's quite a plus. The shift is crisp and of reasonably short travel. As for the wipers, they're noisy but effective. They wipe parallel, and they clean that dead spot in the center of the windshield.

*Comstock:* At night I got a windshield reflection of the panel. The instrument panel, especially the gas gauge, is overstyled, by the way.

*Mann:* I liked it. And the visibility all around is superb.

*Rowsome:* I was agreeably surprised at the light the two headlamps could throw.

*Francis:* Not as much as the Corvair's four.

*Comstock:* Nobody has mentioned the hood. It's not counterbalanced, and you have to prop it up for servicing.

*Francis:* Nobody has mentioned the fuel filler pipe, either. It has a flat entry. I never once got gas without its gushing out when the tank got full.

*Comstock:* Yes, more than one pump jockey remarked that he'd hate to see the paint below the filler tube six months from now.

### **The Comfort Factors**

*Mann:* The car is exceptionally roomy.

*Comstock:* Except for the transmission hump in front.

*Allaway:* I liked the leg room and the seat widths.

*Luckett:* The car is exceptionally easy

[\[Continued on page 232\]](#)



*Slithering up a frozen logging road in Maine, lightly loaded Falcon lacked solid traction. But it got through.*



*Falcon parked cozily in space at curb that was too small for standard car.*

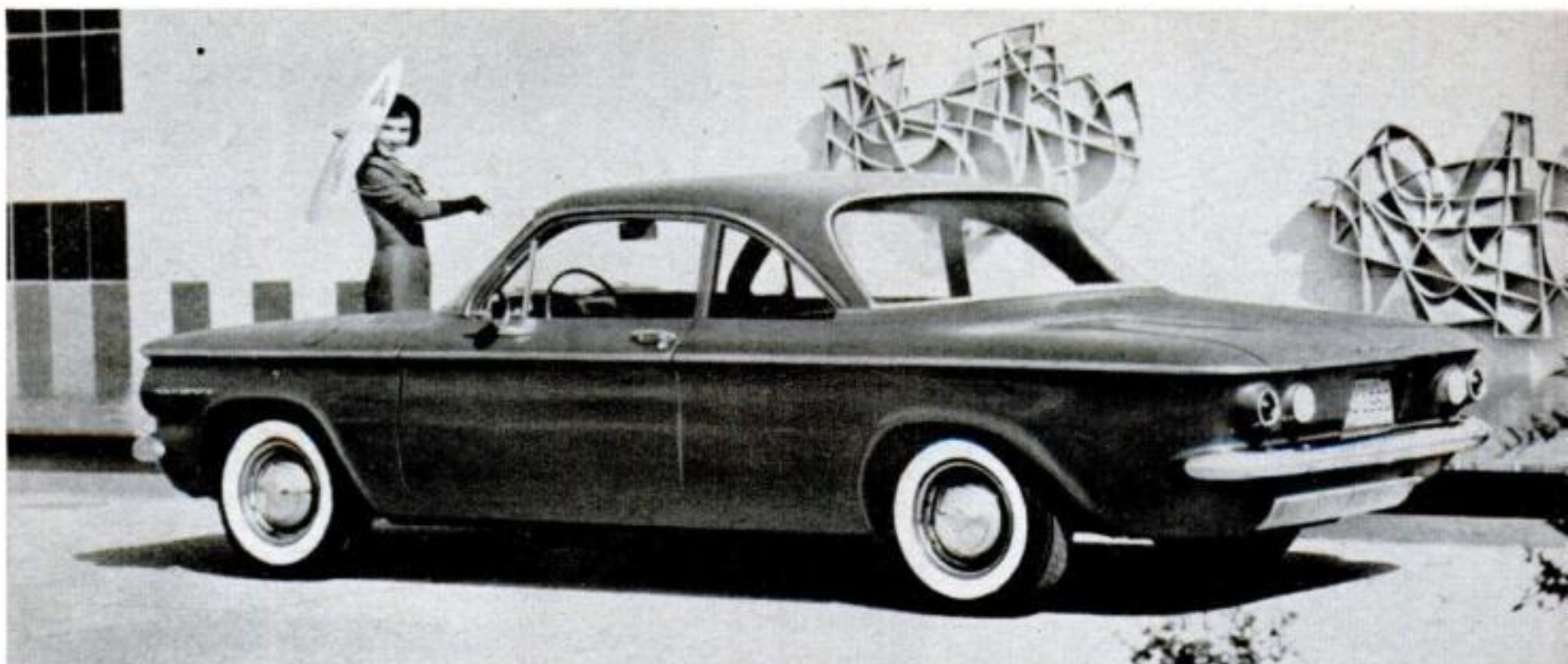


**NEXT MONTH:** Don't miss Popular Science's report on—

## **10,000 Miles in a Chrysler Valiant**

—plus a comparison with Chevy's Corvair and Ford's Falcon.



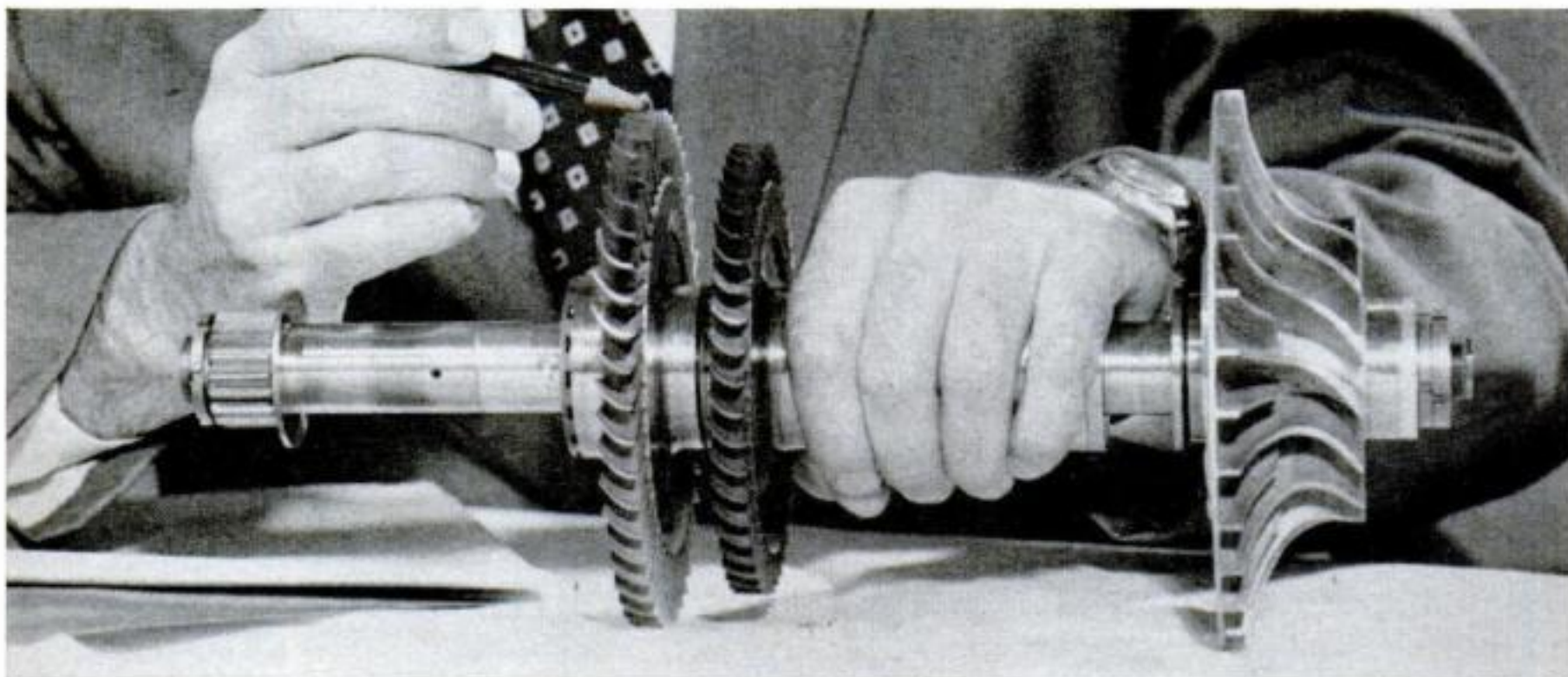


Two-door Corvair is almost identical with the four-door model, but will sell for slightly less.

## COMPACTS BRING OUT SPORTY NEW MODELS

Detroit's newest compact cars are now appearing—or soon will—with variations in design. Chevrolet's rear-engine Cor-

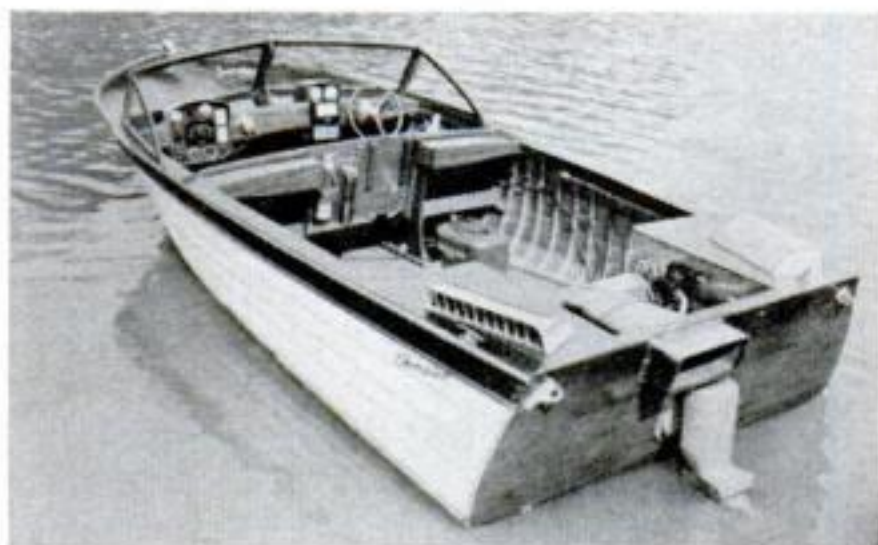
vair will have a two-door version this spring. Only four-door models are being made at present.



Chief components of Williams engine are two turbine wheels (left) and radial-type compressor.

## NEW TURBINE DESIGN FOR BOATS OR CARS

A new lightweight gas turbine, producing a horsepower for each pound of weight, is designed for boats, small planes, or even cars. Not much bigger than a bread box, it runs at 58,500 r.p.m. The geared-down output shaft turns at 5,000. By routing exhaust gases through a heat exchanger, the turbine recaptures energy normally lost. It is made by Williams Research Corp., Walled Lake, Mich.



Engine on this cruiser puts out 75 horsepower.





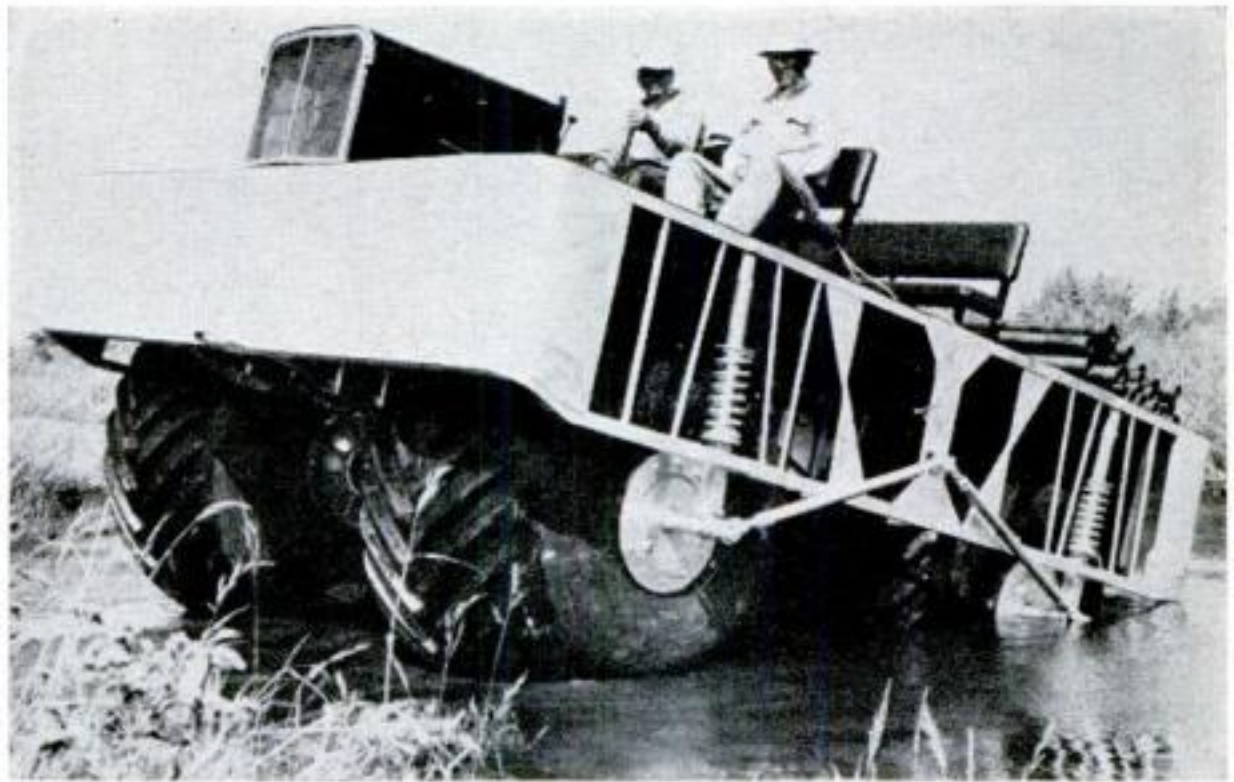
Falcon wagon has a curb weight of 2,631 pounds. It carries spare under cargo-compartment floor.

Ford Falcon six-passenger station wagons are being readied for the showrooms, with either two or four doors. Eight inches longer than the sedan—for a total of 189 inches—the wagons have a cargo

area 106.6 inches long from the back of the front seat to the tip of the open tailgate. They have a maximum volume of 76.2 cubic feet. Loading aperture is 45.5 inches wide, 27 inches high.

### HUGE WHEELS

that are practically all tires enable this marsh buggy to tote as much as 4,000 pounds over soggy terrain without sinking in. Made by Crain Brothers of Grand Chenier, La., buggy is fitted with low-pressure Terra-Tires. They are five feet high and 42 inches wide. Vehicle is designed primarily for oil exploration and for carrying personnel into swampy areas. With a full load, gross weight is 8,000 pounds.



**BLINDFOLDED** students in a language class at the University of San Francisco are able to concentrate on what the teacher is saying without visual distractions. Father P. Carlo Rossi, the instructor, got the idea on an airliner where passengers were given masks to allow them to sleep despite bright sunlight outside.

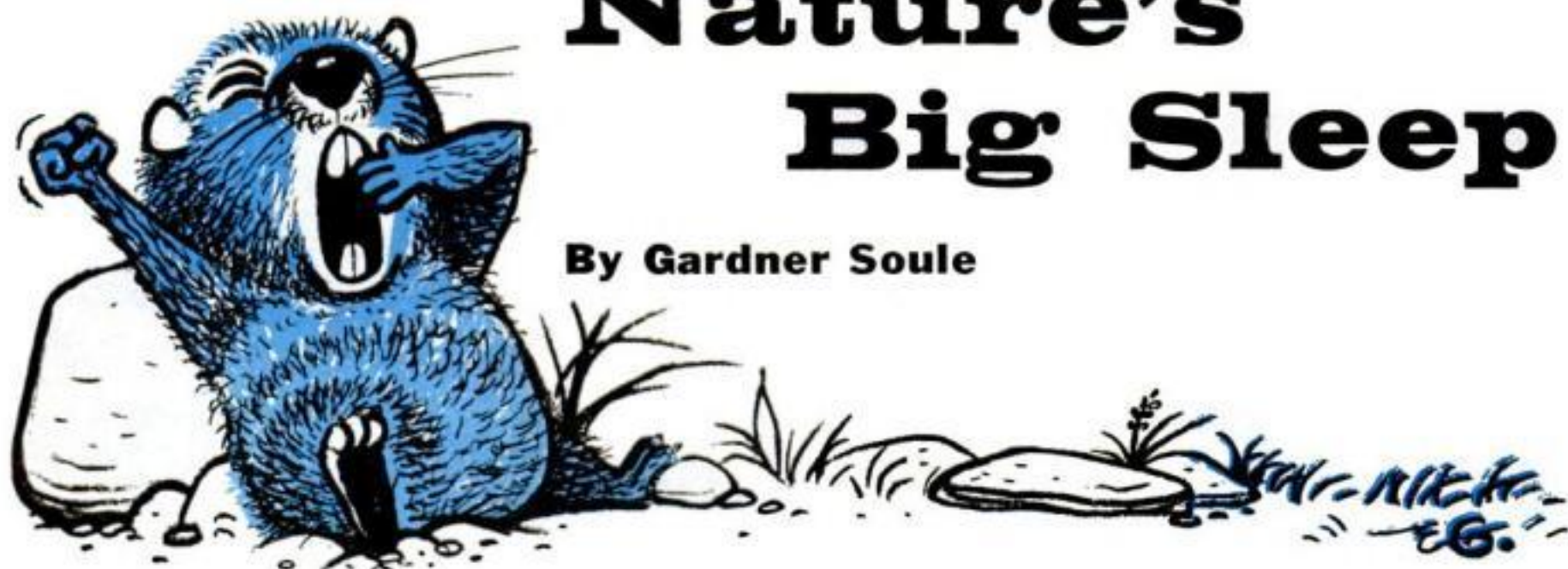




**Science probes into the strange phenomenon of hibernation.  
Here's what we are learning about—**

# Nature's Big Sleep

By Gardner Soule



**I**F A groundhog sees his shadow on Feb. 2, does it mean we're going to have six more weeks of winter weather?

Few people, probably, believe so nowadays.

Nevertheless, scientists at no-nonsense research centers such as Harvard Medical School have lately been taking a closer look at the central character in the Groundhog Day legend.

Their studies are probing into one of nature's strangest mysteries: hibernation—that deep, deep sleep from which the woodchuck, or groundhog as he's also known, supposedly wakes on Candlemas Day each February.

Their findings shoot some new holes in the legend. Says Dr. Charles P. Lyman, a Harvard biologist who has been studying woodchucks, hamsters, and other

hibernating animals for the last 10 years:

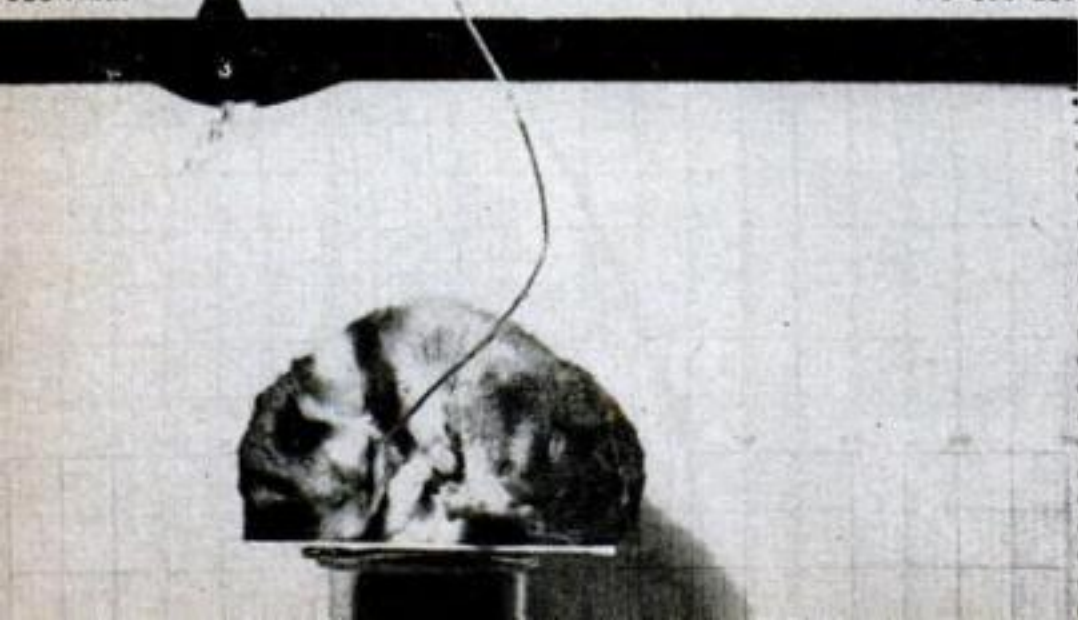
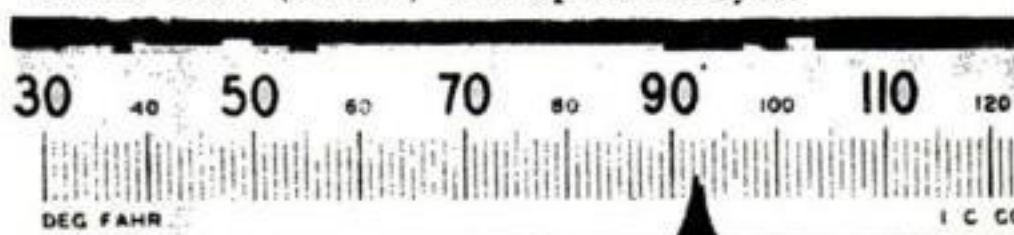
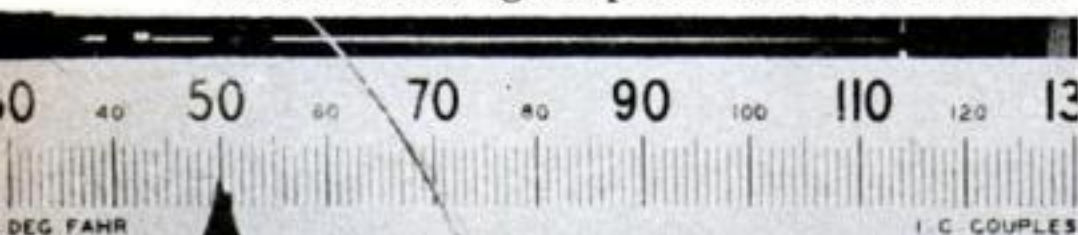
The woodchuck is an even better hibernator than folklore gives him credit for being. He sleeps in a burrow, below the frost line, for six or seven months. And he is not likely to prowl around on Feb. 2, which to him is still midwinter.

But his hibernation is not, as often supposed, an unbroken sleep. The animal is very much alive, although the processes of life go on very slowly. The chuck, for example, wakes every three weeks or so to relieve himself. This may be the purpose of any trip he makes out of his burrow in February.

A strict vegetarian—as gardeners in the northern two-thirds of the U. S. can irately testify—the woodchuck would find little food around in February. In the Northeast, he is most often reported up and around in March; in Colorado, a

**THE DEEP SLEEP:** At 50 degrees F. in the Harvard Medical School cold room, a hamster curls up into a hibernating sleep that could last months.

When the temperature in the room goes up to simulate the arrival of summer, the little animal rouses itself (below) and opens its eyes.







**FAT AND SASSY:** As winter approaches, the groundhog eats like a pig (though he's really a rodent), ballooning to as much as four times normal size. Will he be out forecasting the weather on Groundhog Day? Don't bet on it, say scientists. He'll probably still be ducking the cold, deep in his winter's nap.



Western version of the woodchuck rarely is seen before April.

The original folk tale, brought to this country by the Pilgrims, was based not on the woodchuck at all, but on another animal: the European hedgehog. Over the years, however, the chuck replaced the hedgehog in the story, and took over its dubious role as a weather prophet.

But though the chuck is no good at predicting the weather, Dr. Lyman believes he has a lot to tell us about how he adjusts to it.

Man, a warm-blooded animal with a normal body temperature about the same as the woodchuck's, has two choices in winter: He can go to Florida, or he can shiver it out.

The woodchuck can do something else: He can hibernate. He can curl up into a ball, lower his body temperature to a few points above freezing, reduce his heartbeats to eight or nine a minute, cut down air intake to an average of one breath a minute, and live quietly, for many weeks, without eating.

If he must answer a call of nature, he usually wakes; if it gets too cold, so that he is in danger of freezing to death, he also wakes. In the process, he warms himself up. What wakes him, or what puts him into hibernation in the first place, is not known. It may be the hypothalamus, an area in the brain above the pituitary that influences many bodily processes, including sleep.

It is the woodchuck's amazing ability to adjust to the weather that makes him

so important to science. "If you can carry your internal environment around with you," says Dr. Lyman, "you can go anywhere. Warm-blooded animals like man can live in a wide variety of temperatures. The snake can't. The frog can't. This warm-bloodedness is quite a stunt."

But the woodchuck can go even further. Says Dr. Lyman, "When the climate is too cold he can abandon his warm-bloodedness. He's even more freed from dependence on temperature than you are."

Thinking of the great cold in outer space, and of future long interplanetary trips (possibly 30 years to Neptune, five or six years to Saturn), he says:

"If we had to go a great distance in space, I would think hibernation would be the way to do it."

The notion is intriguing. A hibernating hamster, for instance, uses only 1/30 to 1/50 of its normal energy, and needs correspondingly less food. Food and oxygen storage requirements in a spaceship could be enormously reduced—if its passengers learned to hibernate.

The Air Force thinks there may be something in the idea; it has supported some of Dr. Lyman's experiments. During World War II, in the Army Air Corps, Dr. Lyman did research in high-altitude medicine. After the war, his research led him into making the acquaintance of three hibernators: the woodchuck; its cousin, the 13-lined ground squirrel (named for its stripes); and the golden hamster.

In one of the big gray buildings of the



Harvard Medical School, Dr. Lyman keeps these animals, today, in small wire cages similar to those that schoolboys use for their pet hamsters. His room is different, though: It is cold, with a temperature around 40 degrees.

If hibernation is to be of service to man, scientists must learn how to induce it. Dr. Lyman tries to put his animals into hibernation. "We give them food (grain), water, and bedding (wood shavings). Then we wait," he says. "If we're lucky, they hibernate." Some don't; others hibernate only after a long time. What triggers hibernation is unknown. A possibility, which some investigators are exploring: that the chucks and other animals secrete an enzyme or hormone that causes them to hibernate. There is only one thing Dr. Lyman is sure must be present to cause deep hibernation: cold.

What do animals do in hibernation? The answers vary. The hamster eats. He lays in a great supply of grain, and wakes often (once a week or so) to nibble and if possible drink water.

The woodchuck follows a different scheme. Before hibernation, he eats and eats till he weighs four times as much as he normally does, and he balloons out till he's almost basketball-size. Even though he wakes every three weeks or so, and may even spend half a year or more in hibernation, he eats nothing during that period.

The ground squirrel follows a middle course—he fattens in advance, and also wakes to eat.

The legend of the woodchuck seeing his shadow is not the only folk tale Dr. Lyman has demolished. A few winters ago, he achieved a kind of fame in New England when he pointed out, to the dismay of woodsmen and hunters, that bears do not hibernate.

The winter was cold, and woodsmen were surprised to see bears wandering around.

"There's no reason why they shouldn't be," Dr. Lyman told newspaper reporters who questioned him.

Letters to editors poured in.

"What I had done," he says, "was attack the legend that bears hibernate throughout the winter. This was like shooting Santa Claus."

Then (shooting Santa Claus really dead) he went on to say that the bear is simply a deep sleeper. It reduces its body temperature only slightly, not to just above freezing. It wakes often, and eats if it can. It wakes very quickly. A way to test this, which he does not advise, is to poke a bear you think is in hibernation.

His hibernating chucks and ground squirrels, on the other hand, take two to three hours to awaken. Poking or handling them can start the slow waking process, but does not necessarily do so. In hibernation, they are cold and rather stiff to the touch, and move only slowly and sluggishly. The hamster appears to go deaf. It is not awakened by loud noises.

As the woodchuck wakes, his body temperature rises from about 37.4 degrees to normal, around 98. He produces heat at a tremendous rate as his metabolism speeds up. His heart, after

two hours, is beating 200 times a minute—against a normal 80—faster than it does any other time in his life. His breath comes faster, too; from one a minute, in hibernation, he speeds up to much more than the normal 25 to 30 gulps a minute, before slowing down.

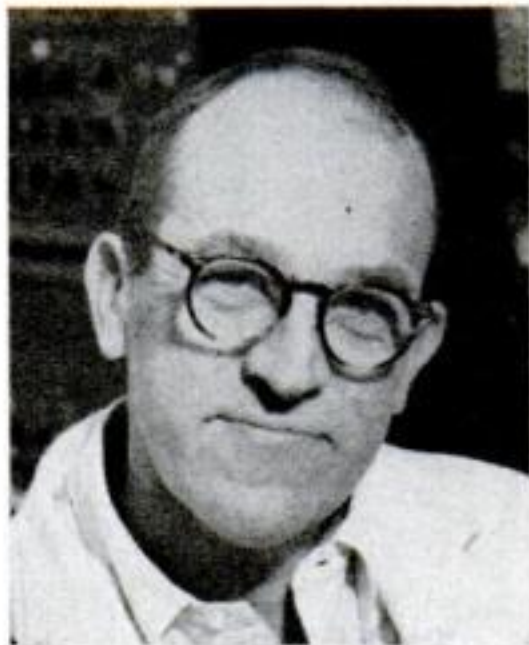
In two or three weeks, in spite of the half-year drain on his fat, he's ready to start a family. He breeds in the spring, and in early summer woodchuck families, with five cubs or so, begin to appear.

Then, in September or October, after growing fat, woodchucks young and old hibernate. They hibernate alone or in pairs. For their deep sleep, the chucks prepare long (10- to 25-foot) burrows, with side tunnels sloped for drainage, and often emergency side entrances that are observation posts against enemies.

What science can learn about hibernation may have other applications for man besides space travel:

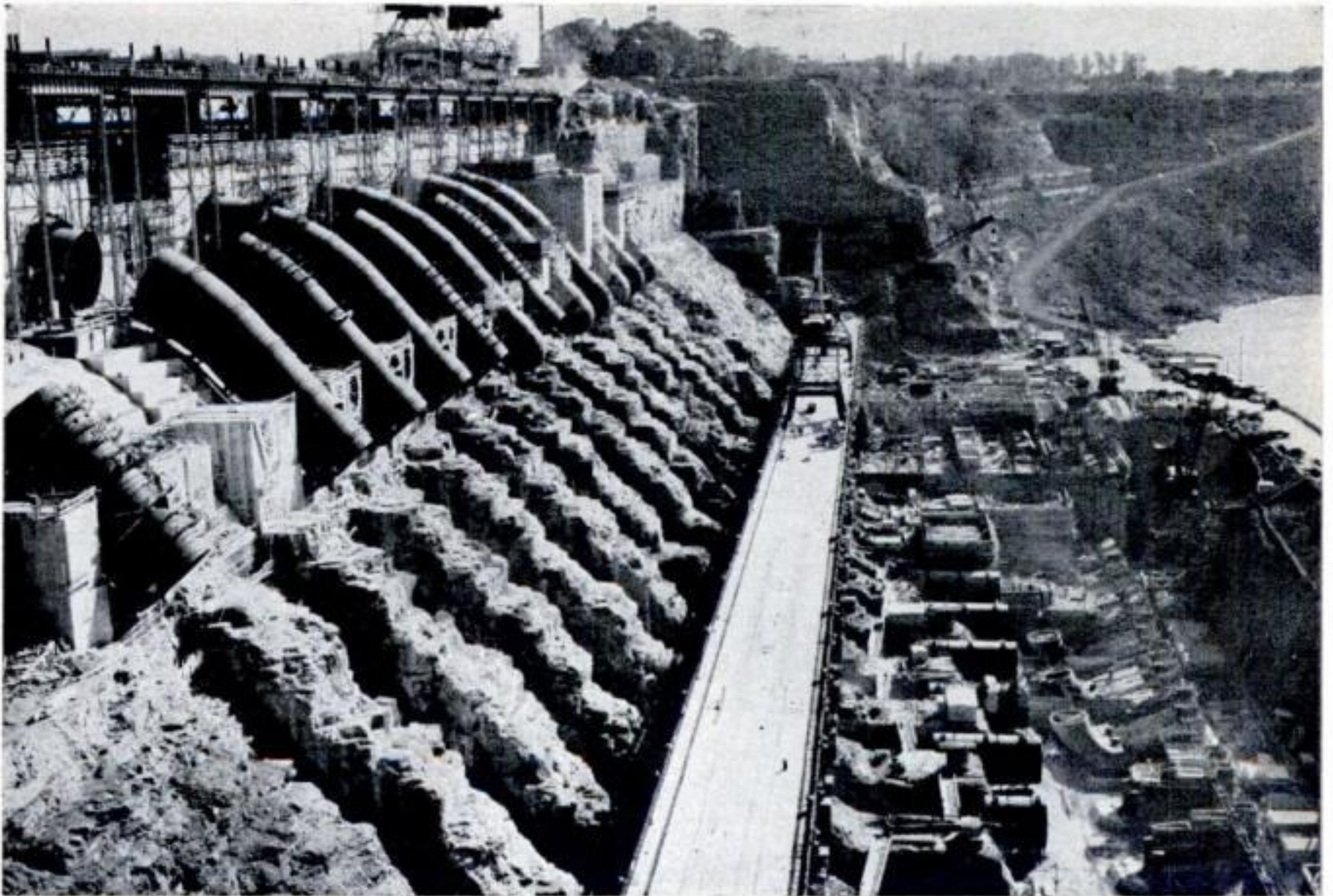
- Surgery. By means of a technique

[Continued on page 254]



**HIbernATION SPECIALIST:** Dr. Charles P. Lyman sees possible answers to many problems in chuck's winter sleep.





**THIRTEEN PENSTOCKS**—one for each generator—will channel Niagara's water. The generators (to be installed at right in photo) will be the largest ever built—150,000 kw. each.



From an intake three miles above Falls, water will flow through four miles of covered conduit.

## TAPPING NIAGARA FOR MORE POWER

Greatest single hydroelectric power project in this hemisphere, the Niagara generating plant under construction above will have an installed capacity of 1,950,000 kw. With nearby smaller Tuscarora,

the project will provide 2,190,000 kw., topping even Grand Coulee. Water from the Niagara River will bypass the city in underground conduits. Restrictions will preserve the Falls' beauty.

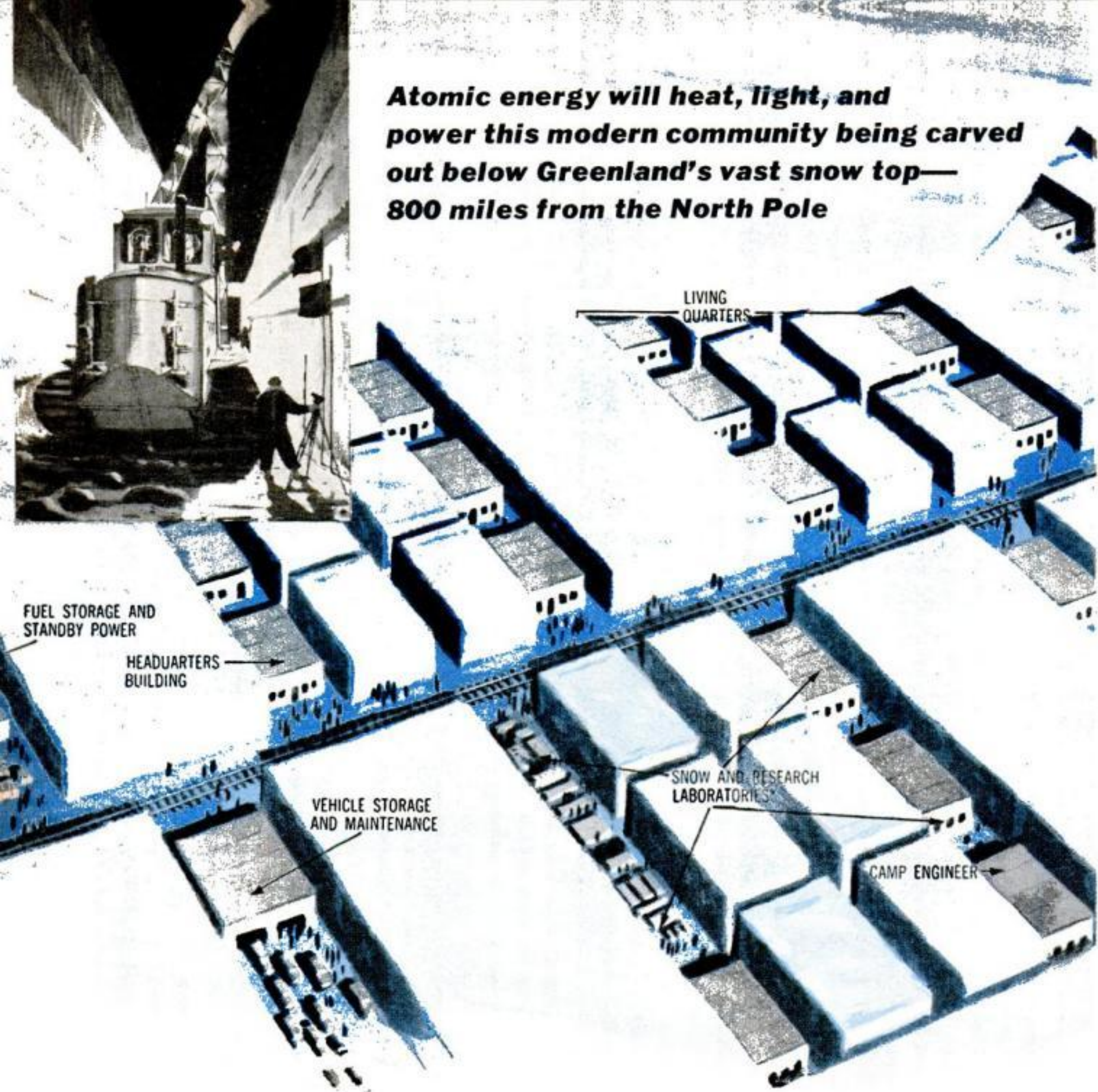
## TWIN TARGETS.

Two Ryan Firebee jet drones are under the wings of this B-26 taking off at Tyndall Air Force Base, Fla. The second is for assurance that at least one target will be on range for missile practice by fast interceptors.





**Atomic energy will heat, light, and power this modern community being carved out below Greenland's vast snow top—800 miles from the North Pole**

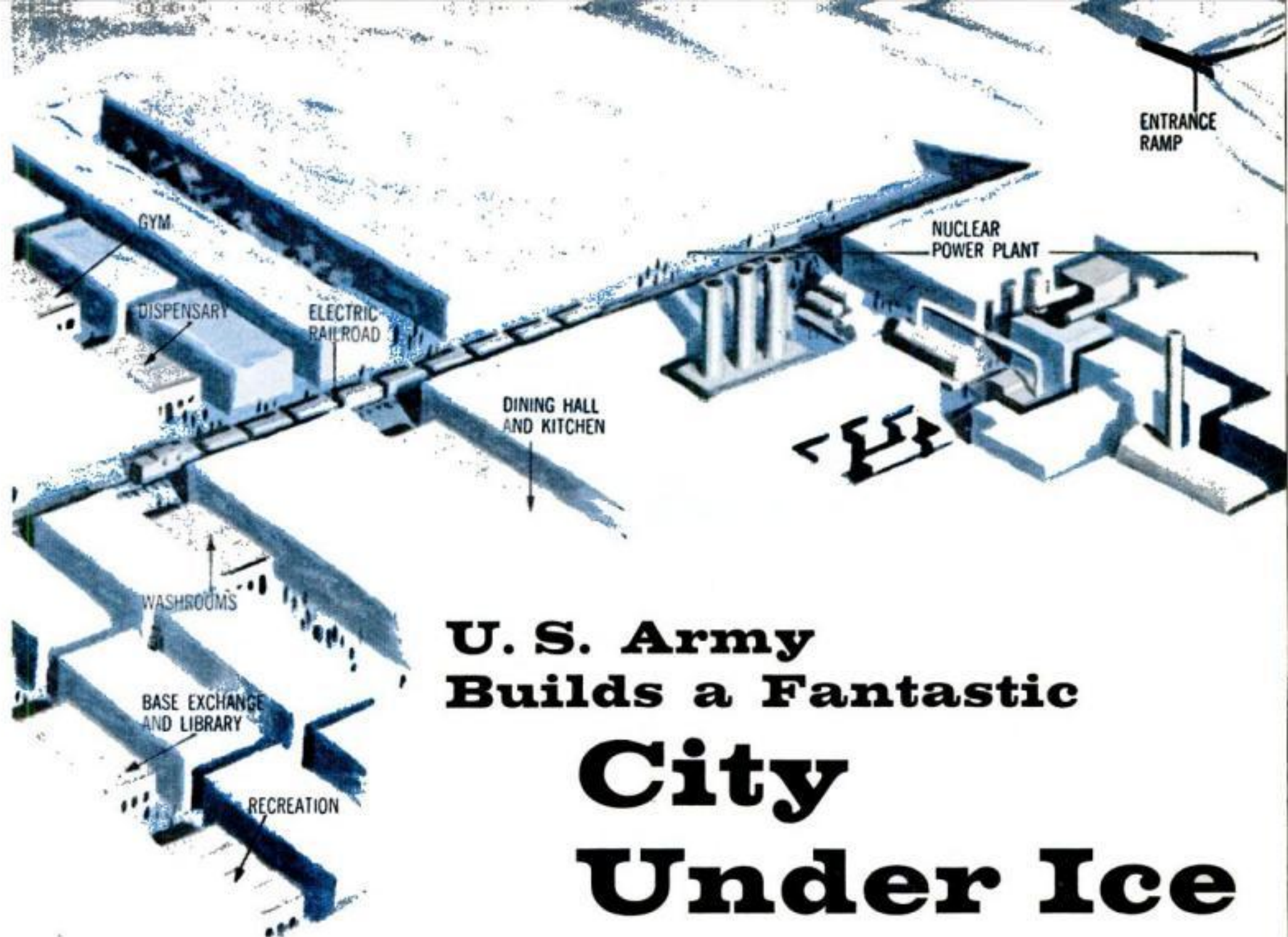


**RAMP ENTRANCE** of compacted snow will provide access for heavy snow vehicles. Doors will be overhead garage type. Blast in the background is from an under-snow explosive charge.

**CUT-AND-COVER PROCESS** starts with a shallow trench. Guide rails in walls insure that snow plow will follow correct line and grade. Here the guide platform is being adjusted.







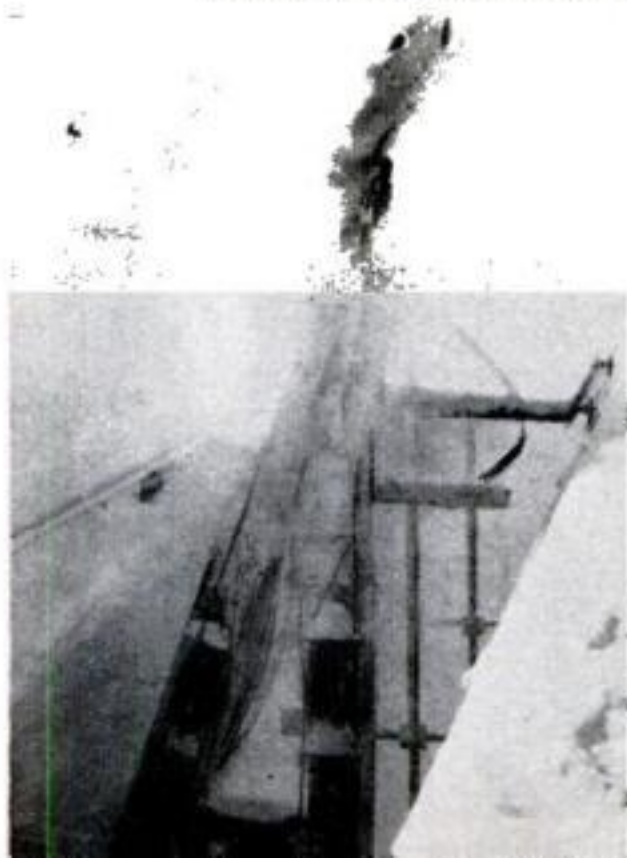
# U. S. Army Builds a Fantastic City Under Ice

By Herbert O. Johansen

**T**HE strangest boom town in the world is being built by Army engineers under Greenland's vast icecap. Completely hidden by snow, it will be powered by atomic energy—and will be about as safe a place as you could find in case of atomic attack. It would be hard for an enemy to find; and snow would absorb much of the shock of an atomic blast, and partially shield the occupants from radiation and fallout.

**PETER SNOW MILLER**, attached to guide platform, cuts deeper with each pass, down to a depth of 24 feet. When finished, Camp Century alone will have more than six miles of tunnel.

**CORRUGATED METAL STRIPS** form a temporary roof, after cut has been made. Powdered snow, blown back over it, hardens fast. Metal forms are then removed from inside and used again.



CONTINUED

87





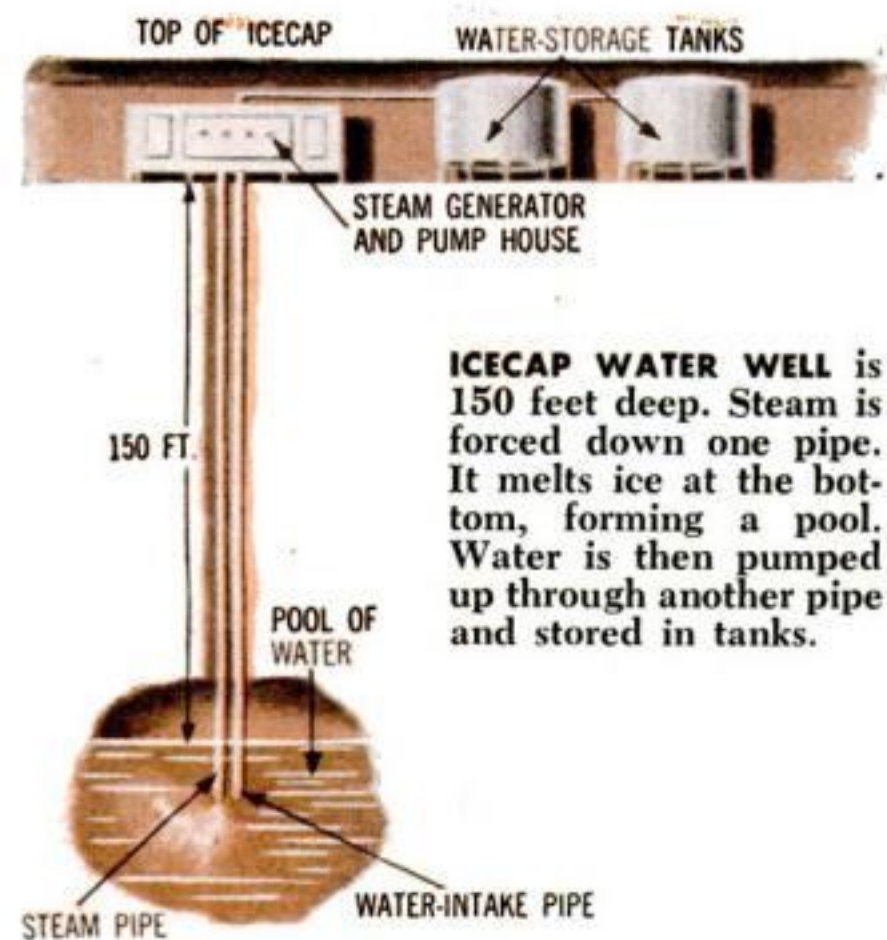
**FOUNDATION IS LAID** for the first Camp Century under-the-snow building. Work on the icecap was halted last September by Arctic winter. Construction will be resumed in May.



**RADIANT HEAT**, with electricity supplied by a nuclear power plant, will keep the buildings comfortably warm. Here you see the heating wire being installed between floor ribs.



**HARD WAY OF GETTING WATER** in Arctic is by melting snow. Camp Century way is shown below.



In building the fantastic community, 800 miles from the North Pole, Army Engineers, in cooperation with the Danish Government (Greenland is a part of the Kingdom of Denmark), have proved that the traditionally antagonistic Arctic can be tamed.

An electric railroad running through a tunnel cut in the snow will connect the town with the supply base at Thule Air Base 152 miles to the west. For air supply there will be landing strips of compacted snow for the largest cargo planes, and landing pads for helicopters.

*It will be home*—snug, comfortable, and warm—for 100 scientists, engineers, and soldiers who are expected to move in late this year. After a hard day's work they will be able to relax with tall drinks cooled by deep-dug ice that was formed long before Columbus discovered America.

It is Camp Century—a year-round haven for the men who will study problems of living, working, or fighting in one of the world's harshest environments, where winter temperatures drop to 70 below zero and winds whirl snow in a blinding fury at 100 miles an hour. With previous shelters, the open season was limited to five months—May through September.

Now the men will live and work in a series of insulated prefabricated buildings connected by snow corridors. Cumbersome Arctic clothing—parkas, bulky mittens, mukluks, scratchy woollies—won't be needed even in the work areas,





**IN A TEMPORARY CAMP**, scientists wore Arctic clothing and worked under rugged conditions in this crude laboratory. In Camp Century labs, they'll hardly know they left home.



**AN ICE CORE IS CAREFULLY REMOVED** from a drilling barrel. Study of such icecap samples, recovered from thousands of feet down, will be a year-round job for the scientists.

where the temperature will be kept at 40 degrees. It will be upped to 60 degrees in living quarters. A ventilation system will exhaust warm air from the tunnels to keep the snow walls at 20 degrees or below so they won't melt. To prevent the snow floor from becoming slush, the buildings will be raised slightly to permit a circulation of cold air underneath.

**Life in Camp Century.** The inhabitants will never see daylight unless they venture outside. But during the worst months of the year—December and January—that won't matter: The sun never rises.

At first glance the unnatural life within the confines of a buried snow town—four blocks long, and three blocks wide—looks forbidding, depressing, killing in its monotony. It would be if a man didn't keep busy and have cheerful surroundings, and facilities for recreation.

Here the residents of Camp Century will score on all points. They will be busy at their jobs—from cooking to researching—eight to 10 hours a day. After that it's up to a man's individual taste. There will be a recreation hall and game rooms, a gymnasium, a hobby shop. A library will share quarters with a Base Exchange.

Movies will be shown every night. Television programs will come from the military TV station at Thule. Radios will tune in perfectly on Radio Moscow across the Arctic. Eating will be in a clublike dining room. Food will be the best (with an extra half ration to compensate for

faster-burned-up calories) and steak will be in plentiful supply.

Spacious dormitories will replace double-down, zip-up sleeping bags; hot and cold showers the occasional lick-and-promise basin bath. A laundry and a barber shop will keep the outer man clean and neat; a 10-bed hospital with an operating room, the inner man in repair. A chaplain and chapel will serve spiritual needs.

Only one comfort of man—beyond the scope of the Army—will be lacking. It is hoped that fast air mail, ham radio-telephone chats with wife and family in the United States, and rotating four-

*[Continued on page 229]*



**ALL THE COMFORTS** of a stateside base—except weekend passes—will be offered. Base Exchange facilities (shown here at a temporary site) will be duplicated at Camp Century.

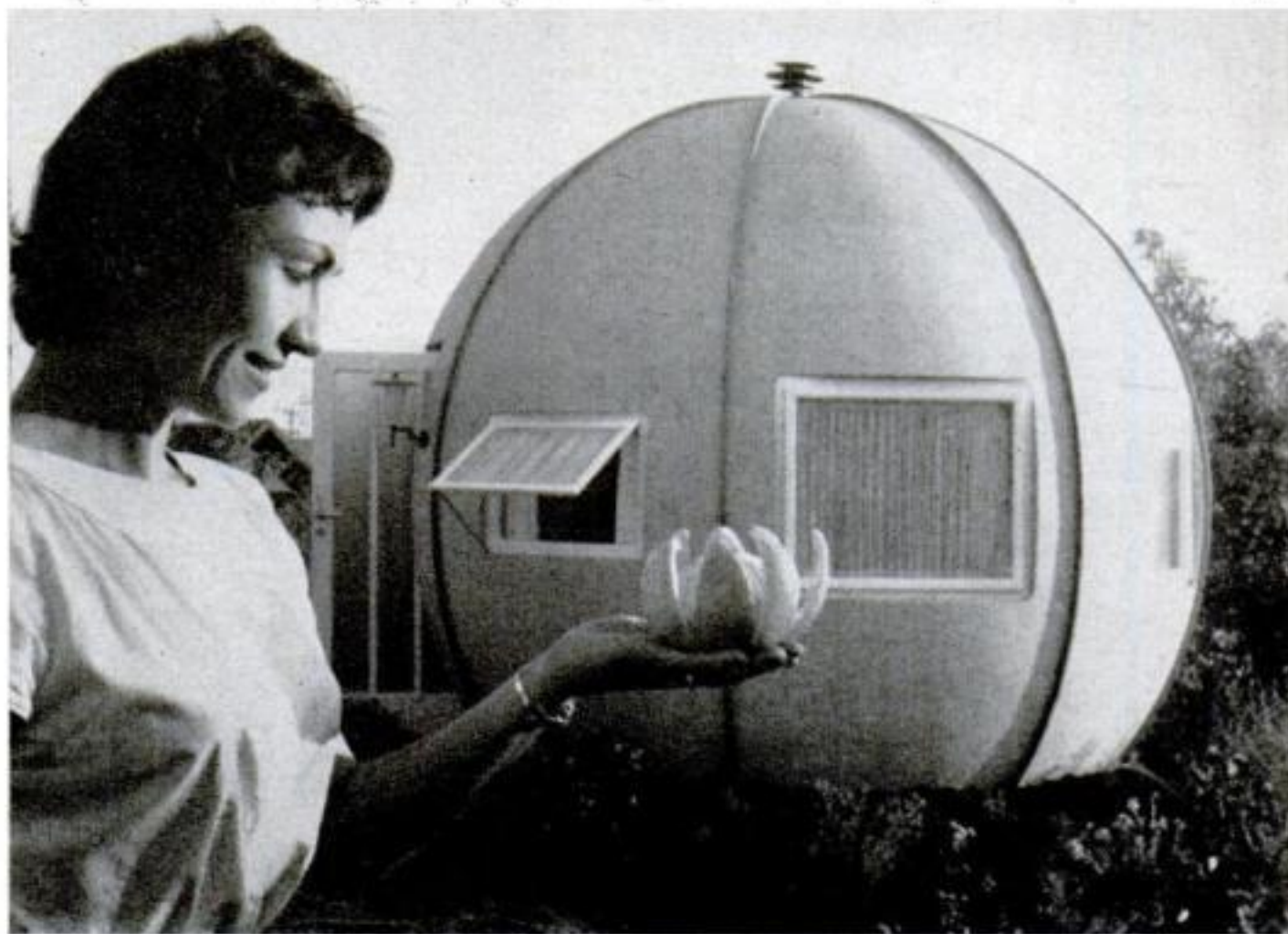


## HOUSE BUILT LIKE PUMPKIN

The plastic shell of this little spherical house is assembled from eight segments. It can then be set in a shallow hole or propped behind low plantings in a garden or at a camp site. Joints are sealed with plastic strips.

Inside its 13-foot-diameter shell are three rooms: a combination living room and bedroom, kitchen, and lavatory. The space under the floor is a storage cellar.

The house was designed by a West German automotive engineer who builds trailers for campers.



Segments are put together like the skin of a peeled orange.



**DENTAL TV.** The instrument used by the dentist at left gives him an enlarged picture of a patient's teeth on the TV screen at rear. It's a probe consisting of some 10,000 hairlike optical fibers. Each fiber picks up the light ahead and transmits it to a closed-circuit TV camera coupled to one end. Avco Corp. developed it for the Navy, sees use for it in exploring body cavities.



**NEW LAUNCHER.** The Army now puts its Honest John missile into flight from the back of a truck. This gives it more mobility than the artillery's biggest guns. The rocket—which can carry an atomic warhead—is hoisted onto the launcher by crane from its carrier and can be transported on it for short distances. Leveling jacks on the truck chassis permit firing from steep slopes.





**TINY KITCHEN** is just big enough for a range, refrigerator, sink, and shelves.

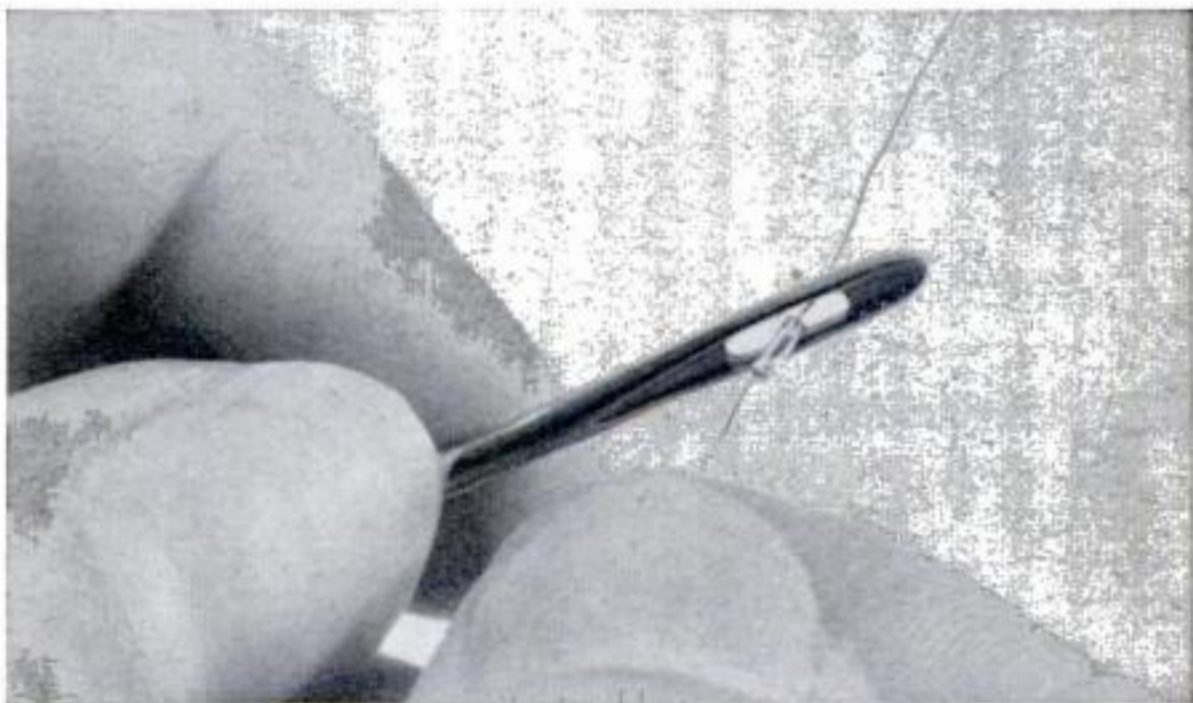


**TILED LAVATORY** has modern fixtures that add a touch of home life to camping trips.



**SHALLOW CELLAR**, reached by trapdoor, is a segment of the sphere under the floor.

**TINY LAMP.** The incandescent bulb being pushed through the eye of a darning needle at right is the smallest ever made on a production line. It has been named the Mite-T-Lite by Sylvania and is for use in transistorized circuits in missiles, computers, and electronic systems. It operates on 1.5 volts, has a tungsten filament, and is .040 inches in diameter and .125 inches in length.



**MOVING TOWER.** This 120-foot smokestack is being hauled to the site of a British oil refinery on two separate trailers. The forward part of its 40-ton weight rests on a trailer pulled by one truck; the rear end is on another coupled to and steered at corners by a second truck. The third truck is a spare—for aid in towing upgrade and for added braking power when going down.



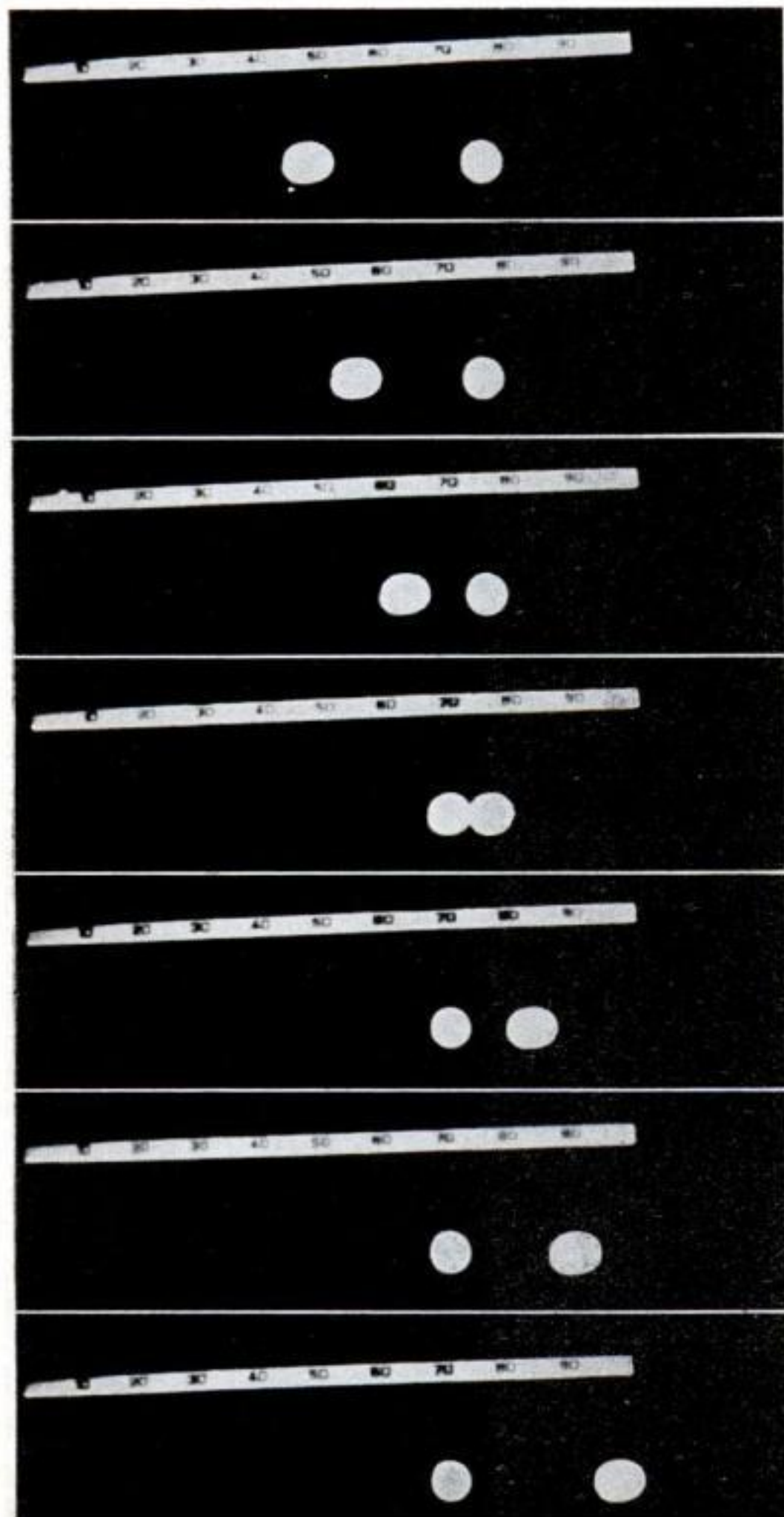




**NOT-SO-WILD FLIGHT:** The wrench seems to tumble erratically—but put a ruler along the

black crosses that mark its center of gravity. The CG goes in a straight line and at unchanging

## Camera Catches Laws



**P**HYSICS can be beautiful—when a master photographer like Berenice Abbott dramatizes the laws of nature on film. These striking strobe sequences are illustrations for a new textbook now being tested in many high schools and soon to be published by D. C. Heath. It is part of the revolutionary physics course, which includes teacher's manuals, experiments, lab equipment, movies, and even outside-reading books, developed by Educational Services, Inc.

The photos hammer home the main theme of the new course: that true knowledge comes from accurate reasoning about nature as it is, not from common-sense assumptions about the way things ought to be. Quite often—as the pictures prove—plain common sense is plain wrong.



**BILLIARDS AND ROCKETS:** When one billiard ball hits another head-on, the first stops and the second goes off with the speed of the first. If the second had been heavier, it would have moved off more slowly—momentum (velocity times mass) stays the same. Rockets work that way, too: Backward momentum of exhaust gases matches forward momentum of the rocket.



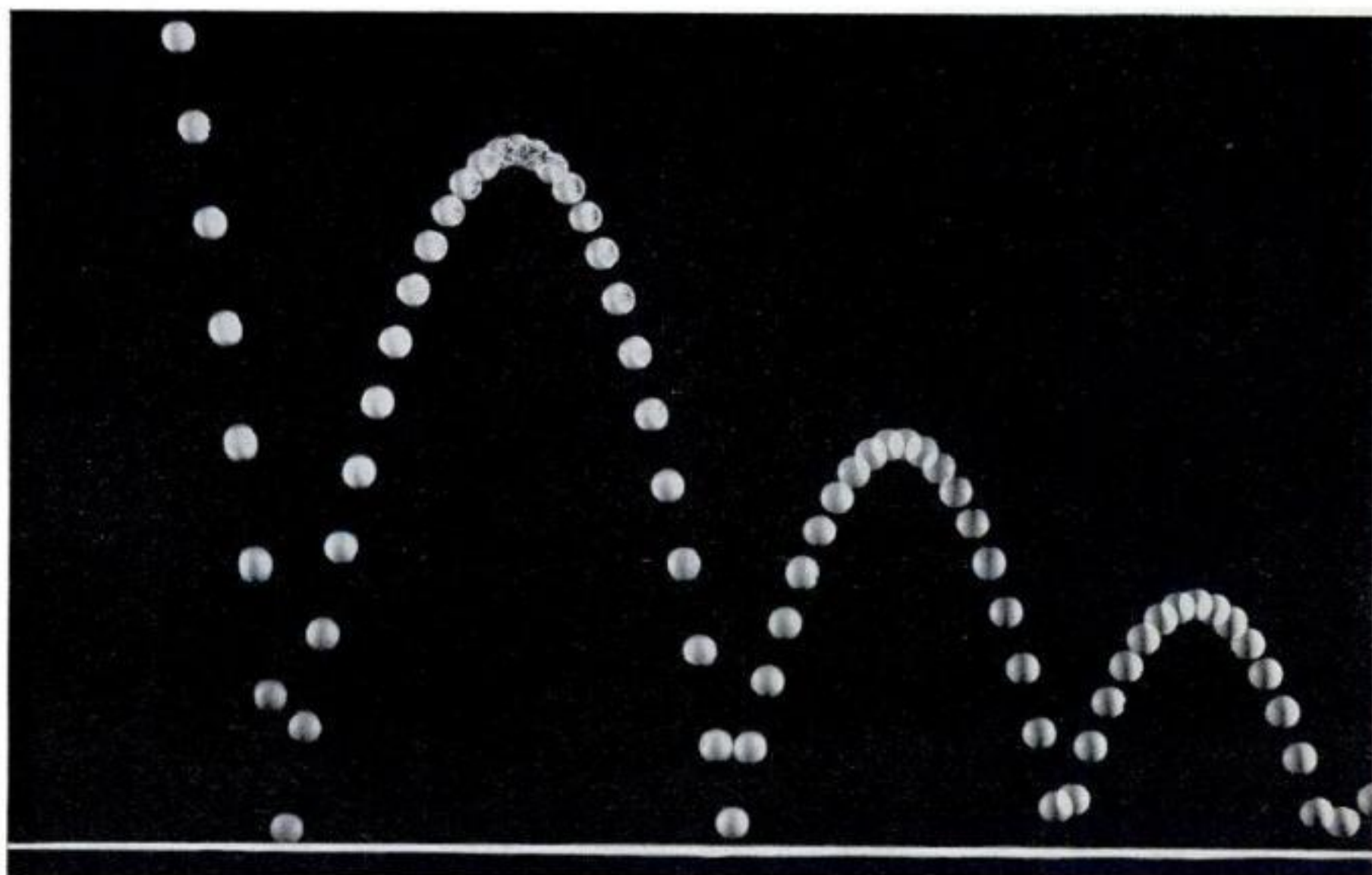
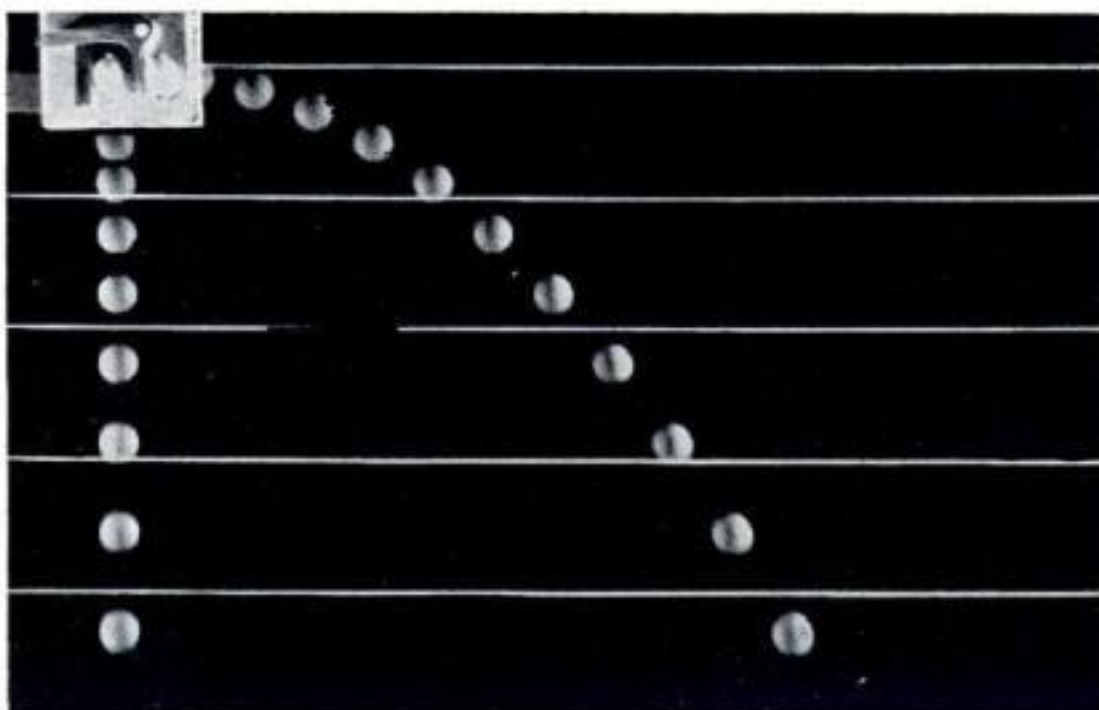


speed (the spaces between crosses are equal). That's what Newton said: When no forces are

acting, a moving object continues forever to move in a straight line and at a constant speed.

## of Nature

**WHICH HITS GROUND FIRST?** A bullet fired from a gun falls to earth at exactly the same time as one dropped from the gun's height, unlikely as that seems. (The demonstration here uses golf balls.) Galileo figured it out: Horizontal acceleration of an object (from the gun blast) has no effect whatever on vertical acceleration of the object caused by gravity.

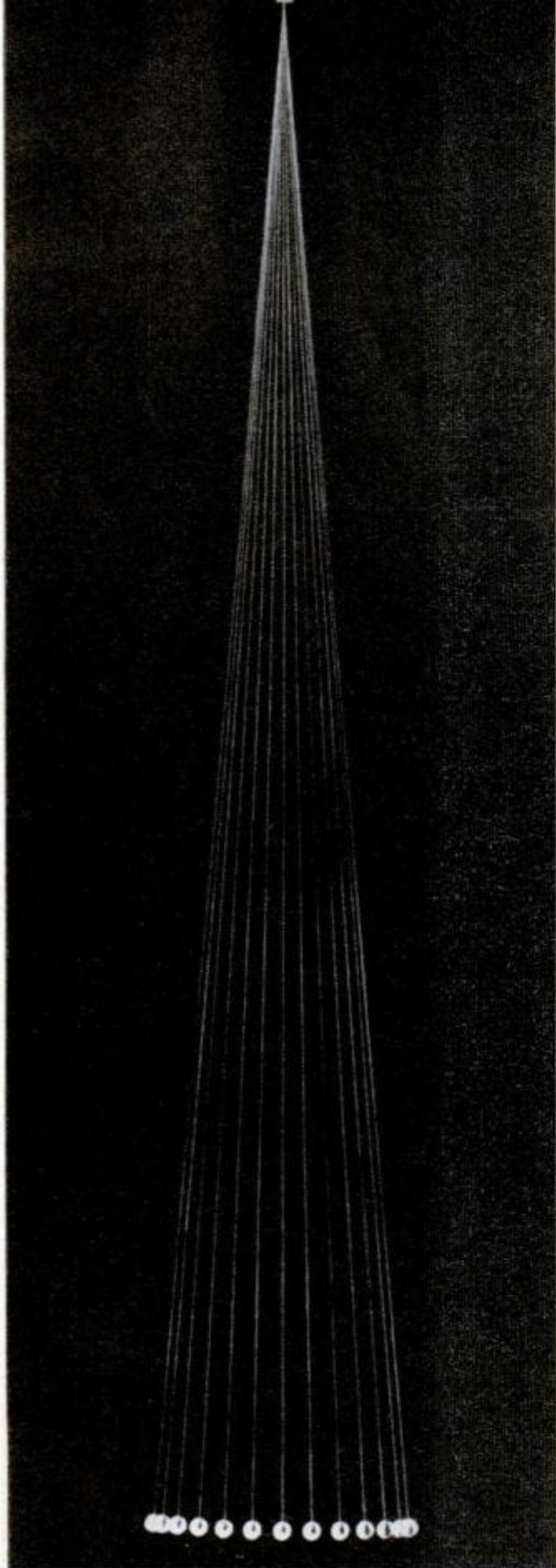


**ENERGY FOREVER:** The ball moves slower and lower with each bounce because it loses energy. But the energy isn't lost—it has been transferred inside the ball and the floor plate to make

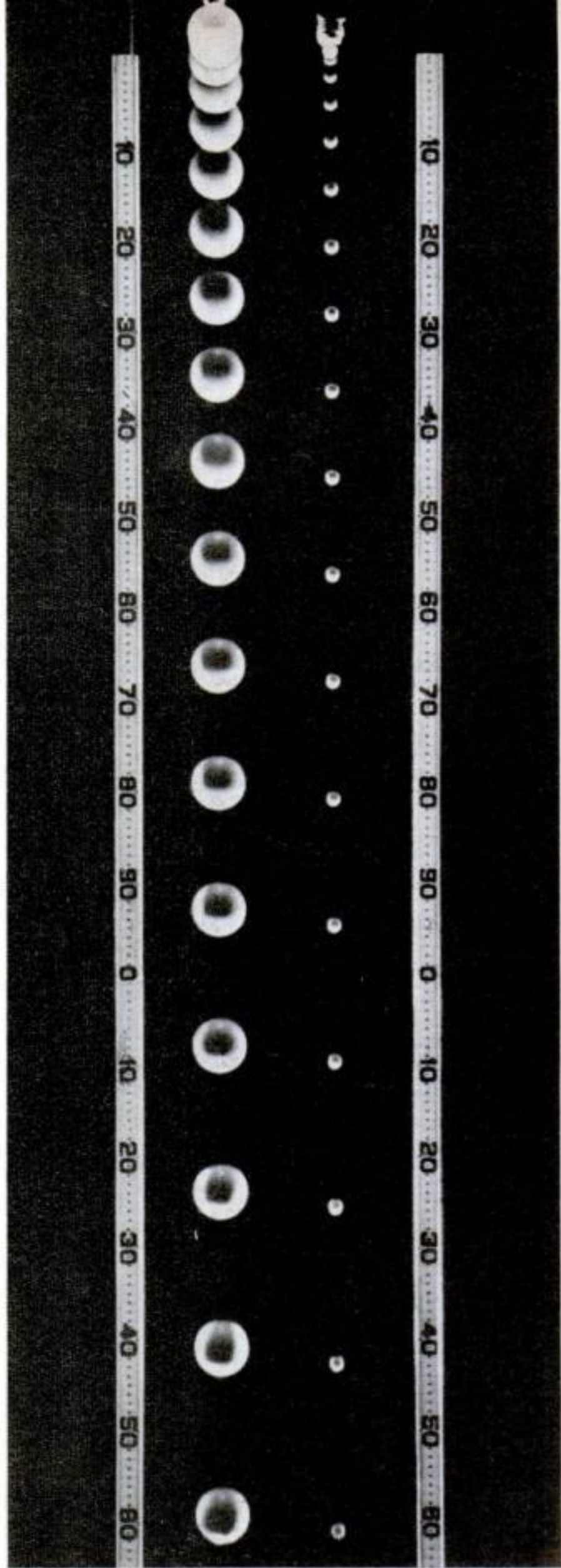
their invisible molecules move faster. The fact that energy cannot be destroyed (or created) is one of the few absolutely positive laws of science—no exceptions, ever.

CONTINUED





**CONSTANT PENDULUM:** This ball swings through a foot in one second. Longer arcs—or shorter ones—take exactly the same time. It's another violation of common sense that Galileo spotted (he was timing—with his pulse—swings of a hanging lamp in Pisa Cathedral). Explanation: On longer swings, the ball falls a greater vertical distance to move faster and keep on time.



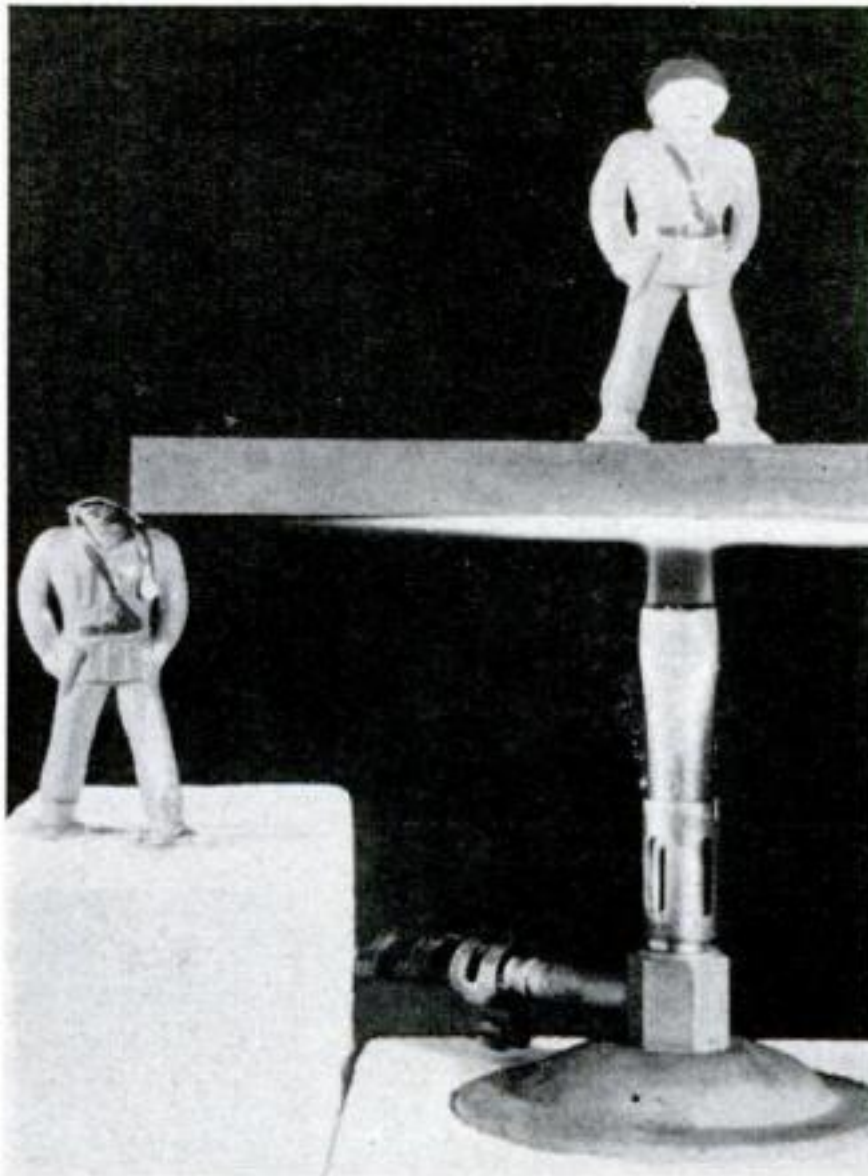
**GALILEO IS RIGHT:** It's obvious common sense that a heavy object has to fall faster than a light one. Only it doesn't. The billiard ball (left) and the light steel ball (right) stay precisely together all the way down in this sequence photo. Einstein pondered this strange fact of nature, and made it a cornerstone of his complex explanation of the force of gravity.



## A 5½-MILE MOVING ROADWAY

That roller coaster (right) is really a belt conveyor that carries 1,000 tons of limestone an hour cross-country in Oklahoma. Changing direction four times, crossing highways and railroads, it runs from Ideal Cement's quarry to its mill.

Seven separate conveyors feed consecutively. A push-button starts the one next to the mill and—as its tail pulley reaches half speed—a relay starts the one ahead. This in turn starts the next one.



**HEAT BARRIER.** Lead soldiers show how Pyrographite solves missile problems. Heat, flowing along the surface of Raytheon's high-heat insulator far better than through it, melts the head of one soldier, leaves the other unaffected.



Boxy trailer on road resembles cargo hauler.



Parked, the front drops, showing band shell.

**BANDWAGON.** This \$10,000 trailer opens and becomes a bandstand for outdoor concerts, or, with the floor laid flat, a stage for plays. Overhead fluorescent lights will hook into power lines of parks in New York's Westchester County.



# Are U.S. Front-Drive Cars Coming?

**Now that auto buyers have taken rear-engine cars in stride, Detroit is casting an eye at another maverick with unique advantages**

**By Ken Fermoye**

**F**IRST, rear engines. Next, front-engine, front-wheel drive? This is a real possibility—for Detroit is definitely showing signs of interest.

Ford, in particular, is studying front drive. The company overhauled a Cord more than a year ago, and has used it for extensive tests. Saabs and other front-wheel-drive imports, moreover, are scurrying around Ford test tracks. Both American and British Fords have been converted to front drive for engineering studies. Such activity, while not unusual in terms of Detroit research programs, does indicate at least the possibility of a front-wheel-drive Ford in the future.

Front drive has many of the advantages over the conventional front-engine, rear-drive arrangement that moving the engine to the rear does.

It eliminates the space-stealing drive shaft, a headache for passengers sitting in the center, as well as for chassis engineers and body designers. Floors can be perfectly flat. Height can be reduced

with no sacrifice in interior height. Weight can be cut and center of gravity lowered.

Front-wheel drive has additional advantages over rear-engine designs:

- More luggage space. There's more room between the rear wheels than the front ones, which need clearance to turn.

CONTINUED



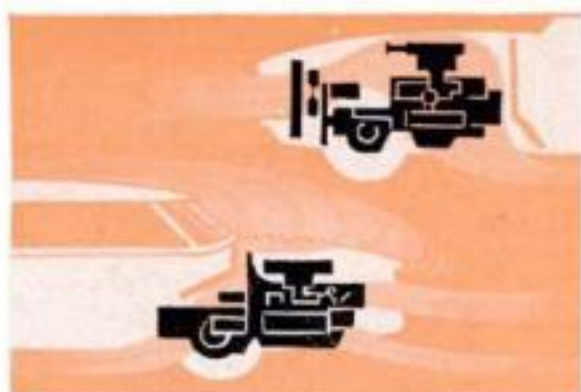
**Christie was an early U.S. F-W-D production car, Cord the latest**

**1904 CHRISTIE RACER** had a bulky, four-cylinder engine mounted transversely over mammoth front-drive machinery. Hard to handle because of all this weight up front, it still set record of 102.8 m.p.h.

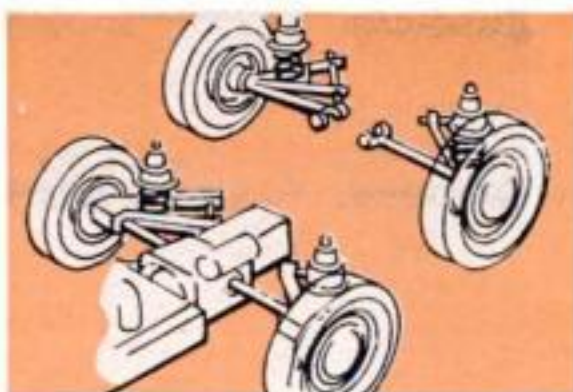
**1936 CORD CONVERTIBLE** and two sedans put the company back in business after a four-year gap. But it folded in 1937 for good. The first Cord, model L-29, was made from 1929 through 1932.



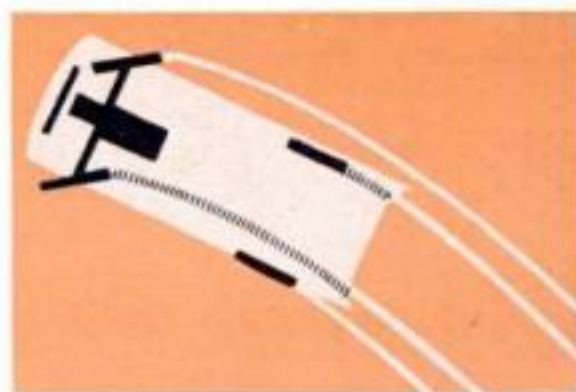
## What's good about front-wheel drive



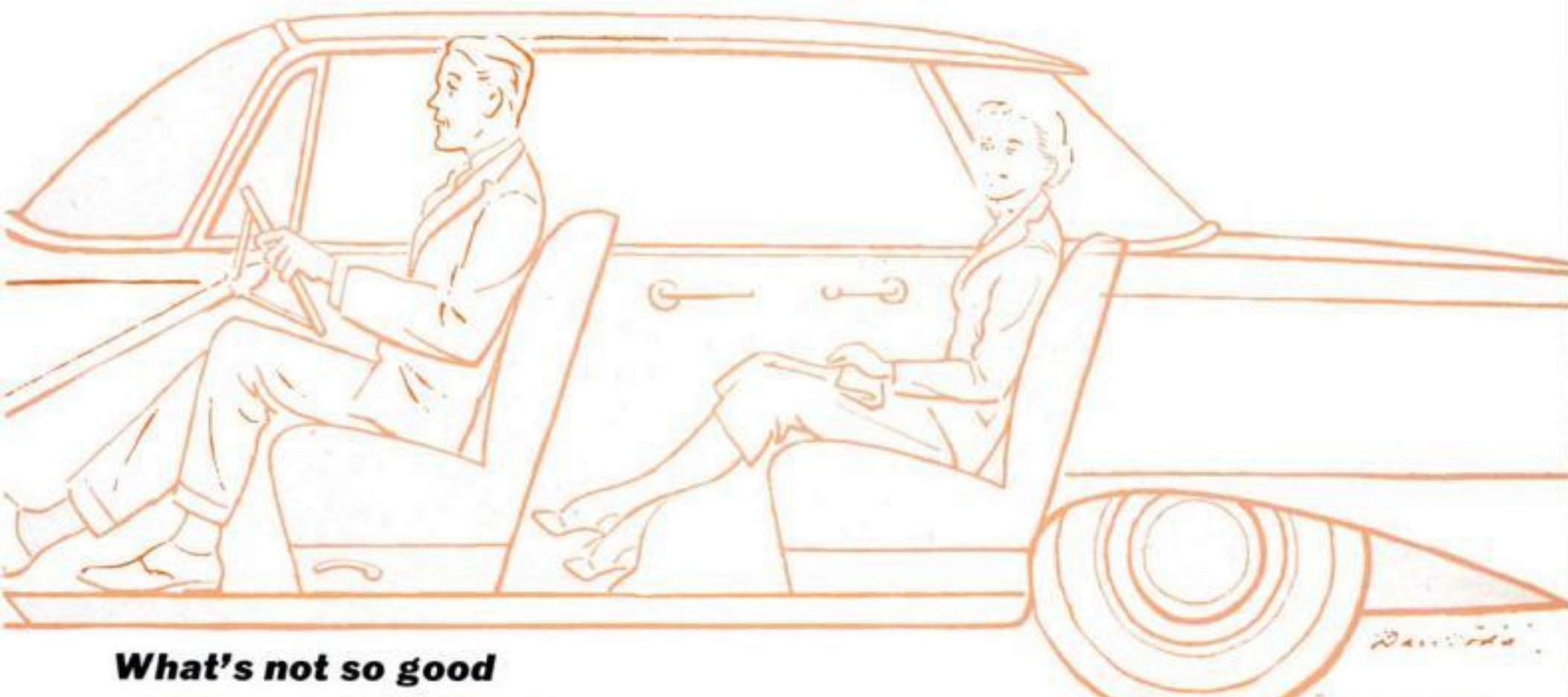
Cooling an engine up front takes simple grille instead of ducts.



Independent suspension of each rear wheel is cheap and easy.



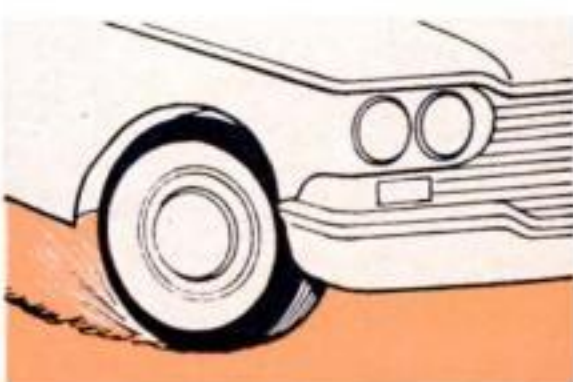
Directional stability is better, according to some experts.



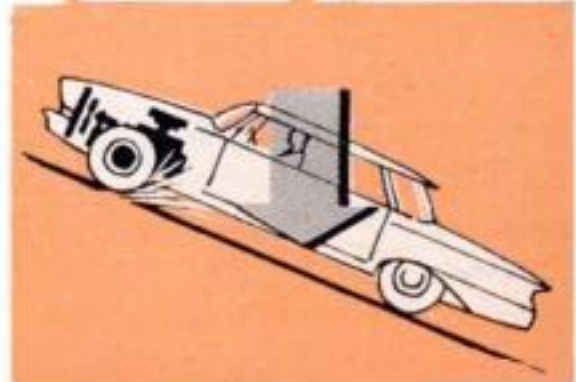
## What's not so good



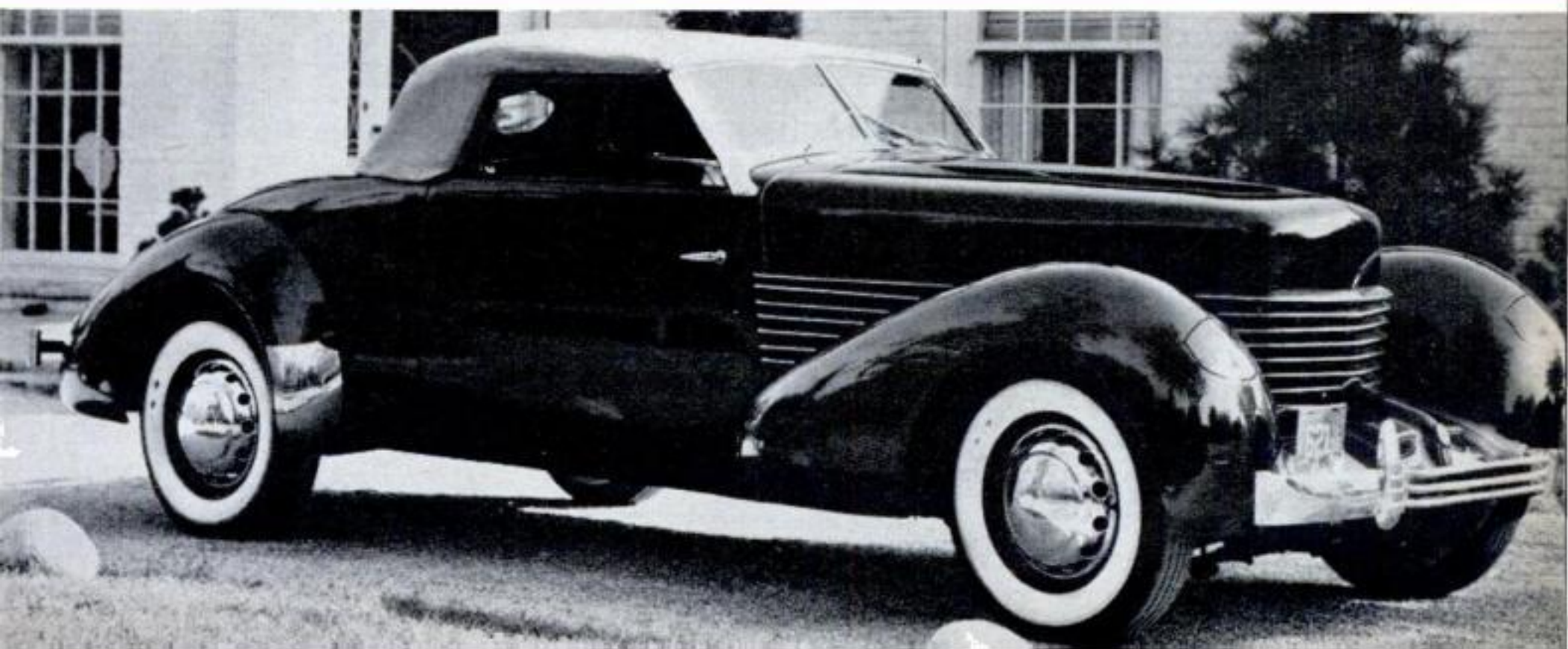
Steering is harder because of extra weight on the front end.



Front tires, handling driving power and steering, wear faster.

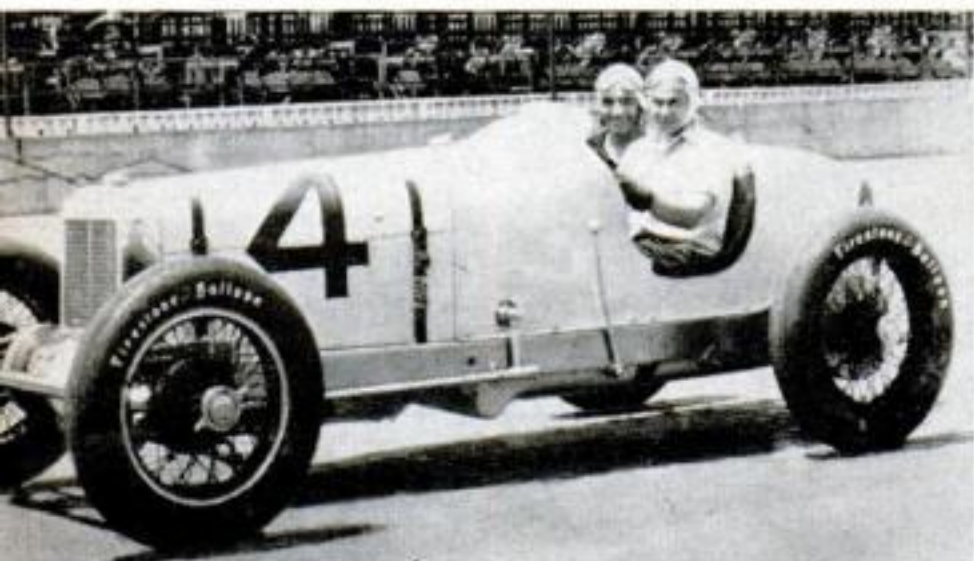


Hill traction suffers when the center of gravity shifts to rear.

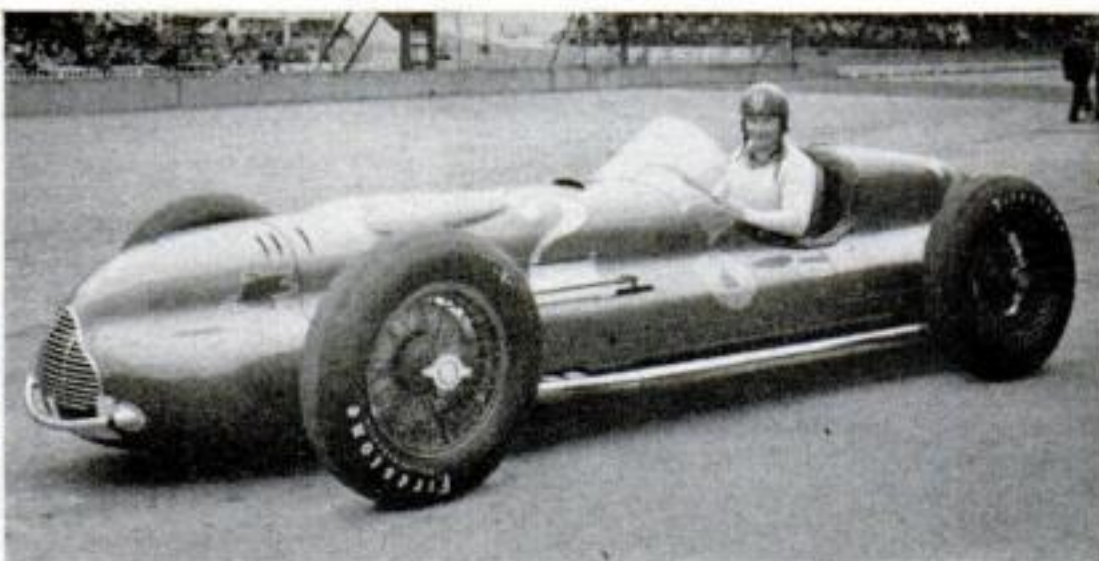




**In U.S., front-wheel drive has appeared mostly on racing cars**



**MILLER-HARTZ SPECIAL**, piloted by Billy Arnold, won 1930 Indianapolis at 100.4 m.p.h.



**NOVI GOVERNOR SPECIAL** set Indy lap record of 134.4 m.p.h. in 1946. Ralph Hepburn drove.

- Simpler rear suspension. Engineers don't have to worry about driving forces. Springing rear wheels independently becomes cheap and easy.

- Easier engine cooling. A conventional grille opening will feed lots of air to a front engine.

- More familiar handling. Front-drive cars tend to understeer; rear-engine cars to oversteer. The average driver is safer in an understeering car, say most experts.

- Better adaptability to various body styles. Front drive is ideal for station wagons and light trucks.

Front-wheel drive involves problems, too. Here are the most important:

- Harder steering. Added engine

weight on the front wheels makes them tougher to turn.

- Greater tire wear. Since front tires handle both steering and driving forces, they're apt to wear faster.

- Costlier parts. It takes constant-velocity universal joints to make front-wheel drive work right—and they cost more than simple U joints.

- Poorer traction on steep hills. Weight shifts toward the rear, lessening the load on the front wheels and reducing their "bite."

- Front brakes work harder. Nose heaviness and weight transfer forward in stopping make the front brakes carry most of the braking load.

**Front-wheel-drive L'Universelle is GM's experimental vehicle for many uses**



**WITH NO DRIVE SHAFT** between front and back, the floor in the spacious L'Universelle is flat and low. The 180-hp. V-8 engine sits astern of the driven front wheels. Air drawn through a grille in the roof flows down to the radiator through a duct. Shown here is the panel-truck version of the General Motors all-purpose vehicle.



## But many European passenger cars have it now



**FRENCH CITROEN** includes front-wheel drive among its many unorthodox "advanced" features.



**SWEDISH SAAB** couples a two-cycle engine to front drive, has won many road-car rallies.

These difficulties don't look as formidable as they did a few years ago. U. S. car buyers are evidently ready, even eager, for smaller cars—and these are especially suited to front drive. Even in standard-size models, the problems can be solved.

**Vanishing headaches.** Modern steering gears, especially power-assist units, can overcome hard steering. Light, compact engines and transmissions are being built. More are on the drawing boards. These would take care of space and weight problems.

Constant-velocity U joints, not needed in conventional drive trains (where U joints don't have to cope with such severe angles and where pairs of them can be arranged so their changing velocities cancel each other out) are no longer a mystery. They've been used widely in civilian and military vehicles—four-wheel-drive jeeps and trucks, for example. Even though more costly than simple U joints, they would become reasonable enough in mass production.

**The pioneers.** Front-wheel drive has not, of course, been unknown on American cars. There was the front-drive Christie which appeared in 1904 and set a speed record of 102.8 m.p.h. as early as 1908. Then came the appropriately named Frontmobile and Front Drive. The Ruxton bloomed briefly in 1928.

The name that means front-wheel drive to most Americans, however, is Cord. Its L-29, introduced in 1929, was first. It suffered from poor weight distribution. The differential was even with the front wheels. The transmission and a long straight-eight engine were mounted in

line behind it. This made for an impressively long hood, but didn't place enough weight on the driving wheels to give them adequate traction.

This was improved in the coffin-nosed Cords of 1936 and 1937. The differential was still centered between the front wheels, but ahead of it was the transmission. Behind the differential was a short V-8 engine. These 810 and supercharged 812 Cords had troubles, but are still held in high regard by auto enthusiasts.

Gordon Buehrig, the man who styled them (and who now works for Ford), feels the big reason they weren't more successful was that "we just didn't have enough time and money to develop them fully before they went on sale. As a result, problems cropped up in early production."

Inadequate radiators caused overheating. The preselector gearboxes with vacuum shifting, used to simplify linkage problems to the forward-mounted transmission, jumped out of gear. There were some difficulties in lubricating and sealing the U joints.

"We licked these flaws and others that turned up, and later production models were good cars. But a lot of harm had been done," says Buehrig.

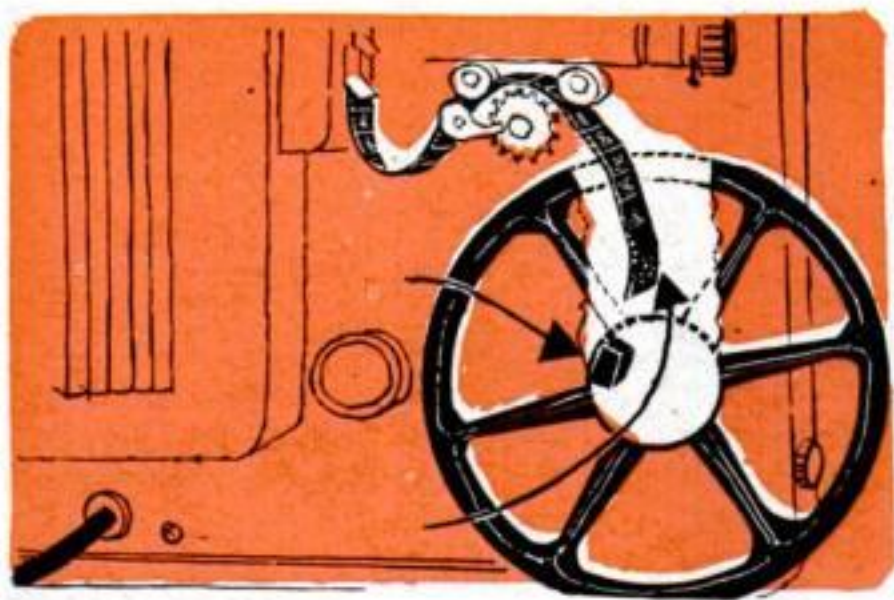
**On the track.** Front-drive race cars have had a successful history on U. S. tracks. A front-wheel-drive Miller Special, called the Junior 8, was the first of the breed to run in the Indianapolis 500. It appeared in 1925—and placed second.

Billy Arnold won the 1930 500-miler in a Miller-Hartz Special, which had

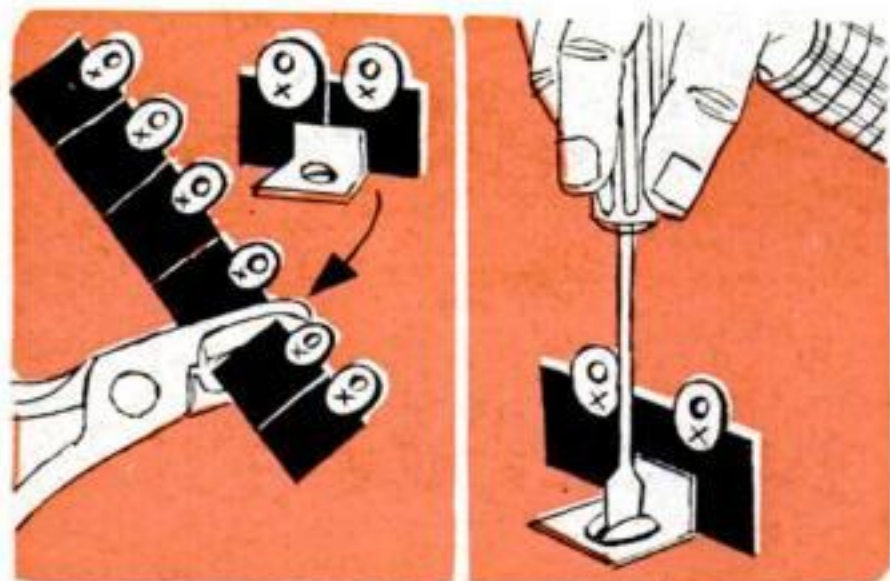
[\[Continued on page 246\]](#)



# "I'd like to see them make..."



**A MAGNET ON THE HUB** of movie-film reels. Then with some iron filings cemented to the end of the leader film, it would be easy to thread.—*H. L. Woodward, Sioux City, Iowa.*



**RADIO TIE POINTS** on long strips that could be cut apart. You'd snip off the number of points needed, and then clip them to the mounting lugs.—*D. P. Schneider, Waterbury, Conn.*



**ABRASIVE GLOVES** with a coating of sand on the palms and the front of the fingers. They'd be fine for light sanding, particularly on small objects.—*Kay Gordin, Derby, Kan.*



**A PULL-DOWN PARTITION** in station wagons for more warmth up front. How about a transparent recessed roof panel riding on tracks like a garage door?—*J. J. Vernimmen, Grand Rapids.*



**EYEGASSES WITH A POCKET** in one sidepiece to hold an identification plate with owner's name and address. Then lost glasses might be returned.—*R. F. Swenson, Worcester, Mass.*

Everyone has his own pet idea of a gadget that he would like to see in general use. The five ideas illustrated above were suggested by POPULAR SCIENCE readers. What's

yours? We will pay \$5 for each one published. Please use Government postcards only. Write name and address clearly. Contributions cannot be acknowledged or returned.

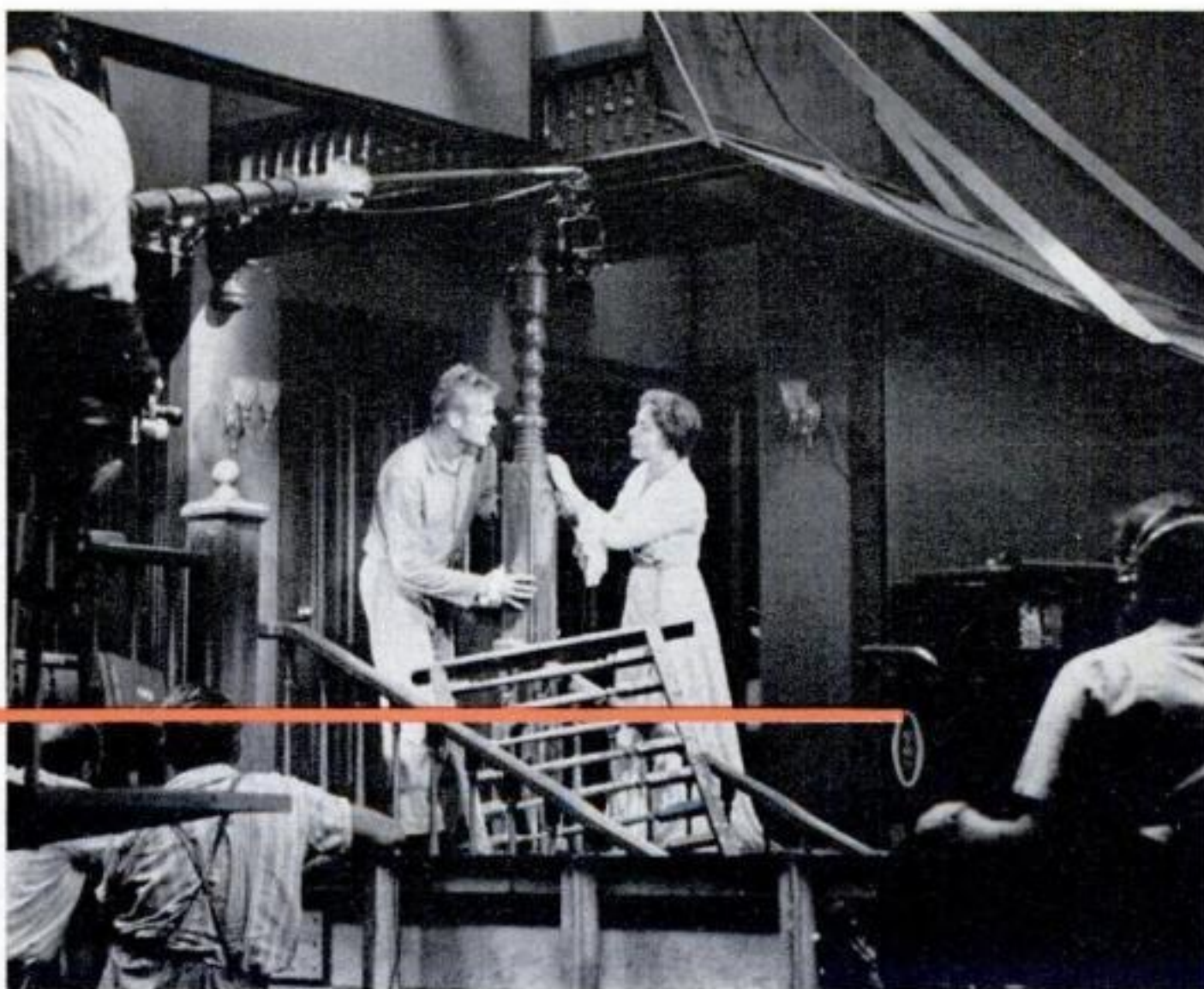


**A modern miracle of electronics lets performers put on a show when they want to, lets you see it when you want to**

# TV Goes to Tape

**It looks live but it's not**

Recording a drama on video tape involves no change in mike, cameras, or lights from a live show. Here Tab Hunter and Jo Van Fleet tape a tense scene of "Disaster Area" for telecasting on GE Theater months later.



**IT'S PRESERVED ON PLASTIC HERE**, in equipment room of CBS Television City, half a block from the performing studio. Tape can be played back immediately, to let cast see how they've done.

**T**HIS year much of the "live" TV you see is about as live as a six-months-frozen mackerel. The shows come off a chocolate ribbon of plastic—video tape—that was recorded anywhere from a few seconds to a year before you see them.

Most of the specials—big-budget drama or song-and-dance—are performed in person only for the tape machines. Increasingly, half-hour filmed shows are switching to tape. And if you live west of the Eastern Time Zone, you get taped playbacks of programs that Easterners see live.

It is a jaw-dropping wonder of modern science that all the sights and sounds of life can be captured on a frail-looking ribbon and then re-created immediately, without processing. The re-creation is

CONTINUED



## How They Record Television on Tape

In storing a television program on magnetic tape, an enormous amount of electronic information must be crowded into a small space. There may be no more than 30,000 audio (sound) signals per second to record, but the video (picture) signals are likely to total 3,000,000 per second!

To capture this vast swarm of electrical impulses, you need a great many particles of magnetic oxide. This means that the particles have to go past the video recording head very, very fast. The tape itself moves 15 inches per second, not nearly fast enough. So the video recording heads move, too, crossways to the two-inch-wide tape. The combined effect of recording-head movement and tape travel is equivalent to a tape speed of 1,500 inches per second.

There are four video heads mounted 90 degrees apart on a small wheel that spins at 14,400 r.p.m. The heads, only 10 mils wide, protrude from the wheel edge like circular-saw teeth. They record in sequence, each taking its turn when it is adjacent to the tape. This leaves video tracks across the

tape 10 mils wide, with a five-mil space between each track. One track records about 16 lines of a 525-line TV picture.

The audio signals, not nearly so numerous, are recorded along the length of the tape, as on a home tape recorder, but in a  $\frac{1}{8}$ -inch band at the top. A tiny extra sound track—the cue track—along the bottom edge of the tape records timing signals, instructions to the operator, and pulses to guide an editor in splicing the tape.

Going through the Ampex machine shown here, the tape first rounds a full-width erase head. That's to make sure it is completely demagnetized of any previous signals and is ready for a fresh recording.

The tape then runs through the video-head assembly, past erase and recording heads for both audio (top) and cue (bottom) tracks, through a capstan assembly that keeps pulling it forward at a constant speed, and around an automatic timer. The tape is forced against the video heads with a pressure of 1,000 lb. per square inch. (This creates great friction and heat). Vac-

often (but not always) so good you can't tell it from the real thing.

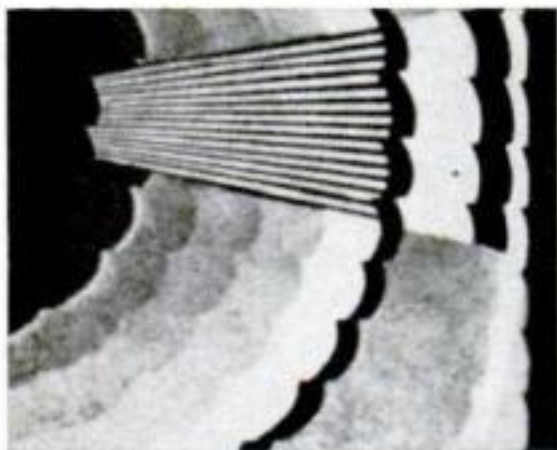
**The big advantage** of recording television electronically and broadcasting it later goes to the TV industry. The reasons are complex, but they all add up to saving money.

Still, you gain, too, because you see better shows. Scenes can be reshot time and again until they are just right. Muffled lines and sour notes can be edited out. Star performers, whose winter evenings might be committed to the legitimate theater, can usually be enlisted for a mid-day taping session.

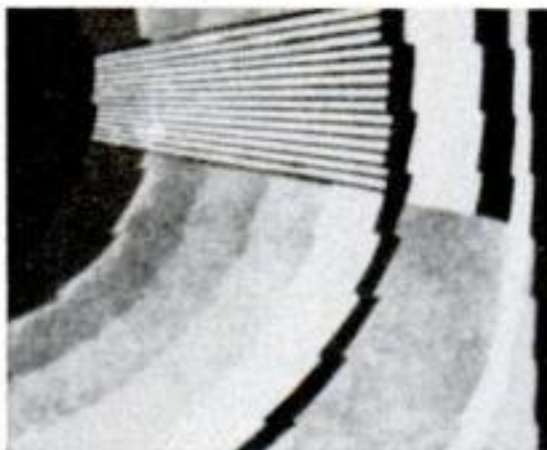
Tape also brings you the shows at a convenient time—Dinah Shore's happy smile appears at nine p.m., whether you live in Seattle, Albuquerque, Kansas City, or Pittsburgh. (To manage that from Hollywood, where nine o'clock arrives last, Miss Shore actually starts singing at six, Pacific Time, and the East sees the show live.)

**How it's done.** Last summer Tab Hunter and Jo Van Fleet made a tape of "Disaster Area." To a visitor on the set, it looked as though the play were being telecast live. Standard TV cameras and microphones fed their signals to the con-

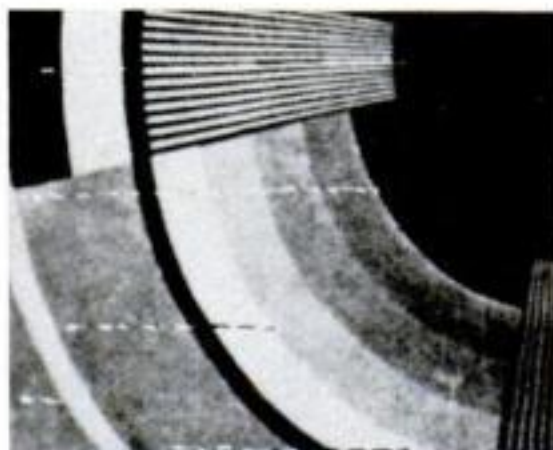
## Is it live or tape? Defects tip you off to a canned show



**SCALLOPING:** If tape isn't lined up in the recording machine, straight vertical lines acquire sharply wavy edges.

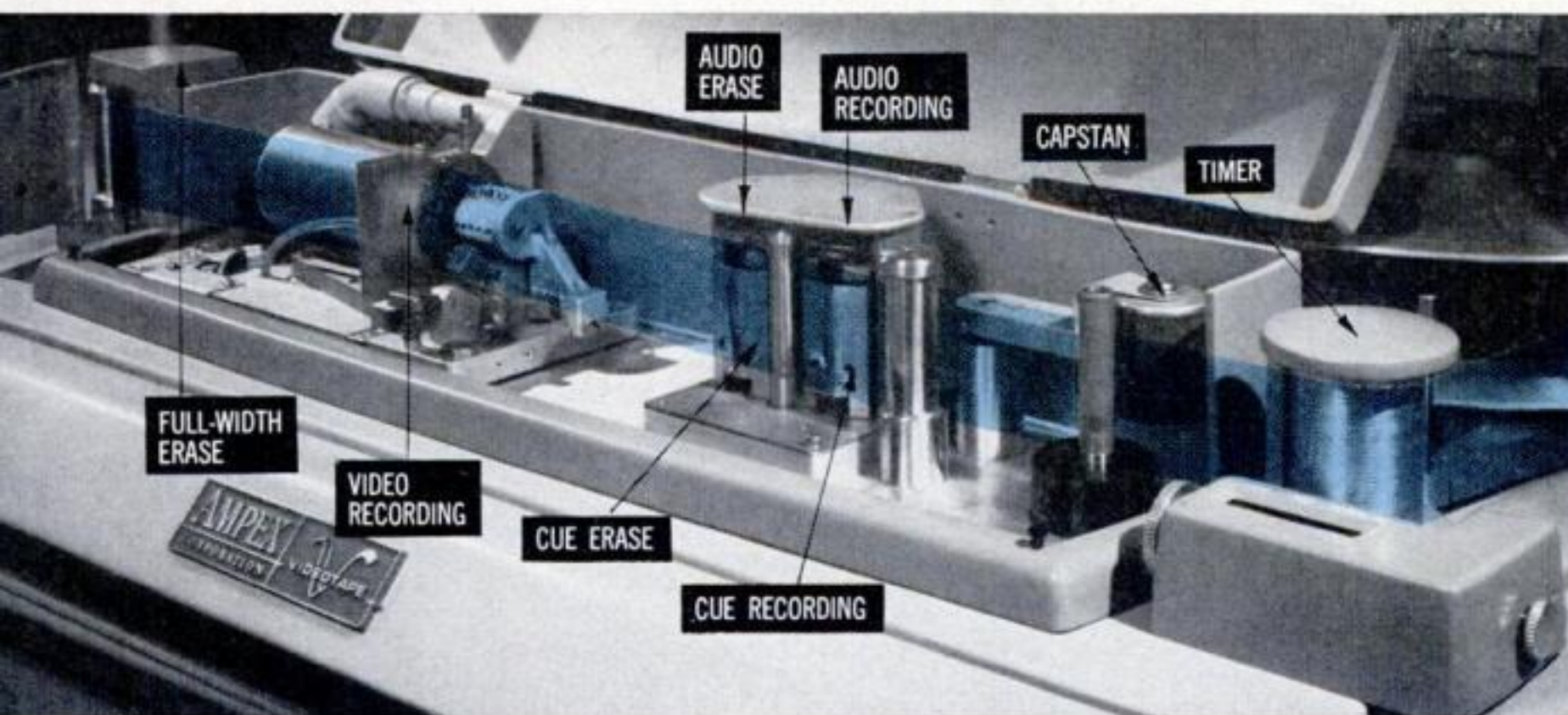


**VENETIAN BLIND:** Sometimes one of the four reproducing heads presses the tape too hard—vertical edges zig-zag.



**BRUSH NOISE:** Streaks—similar to ignition interference—come from poor contact in connection to rotating heads.





uum holds the tape firmly in place in a concave guide.

When a program has been recorded and is played back for telecasting, the recording heads pick up electrical signals from the

tape instead of leaving magnetic patterns on it. These signals are fed from the recorder to a TV transmitter, and you see them on your home set just as if they were coming straight from the camera.

trol room. But then the signals went, not to a transmitting antenna, but to a room on the floor below.

Here, a man with headphones sat at a steel cabinet the size of an office desk. On top lay two chunky metal reels loaded with video tape, two inches wide and almost as thin as carbon paper.

The tape rolled 15 inches per second, quietly recording a tense living-room scene. The operator could see the action only on the monitor screen above him.

After three or four minutes, the monitor went blank and an unseen voice said, "Let's see that scene, Jim."

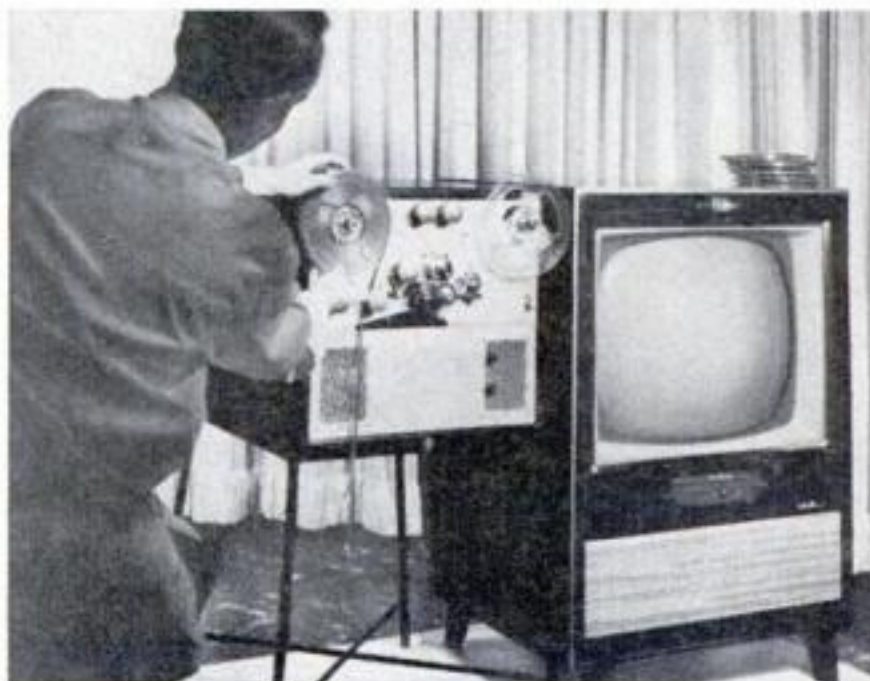
Jim sent the tape whirring backward for an instant. Then he leaned toward a mike. "Okay. Here goes."

Onto the monitor screen flashed the images of the actors on their sofa, as bright and clear as before. When the television audience saw the play months later (as part of the General Electric Theater series), they saw it the same way, off the tape. That tape could be repeated 100 times or more without noticeable loss of clarity. Or the same tape could be used to record 100 different shows, and erased after each one. Some tapes have already weathered as many as 200 replays.

Video tape, made by Minnesota Mining and Manufacturing Co., is glossy on one side, dull on the other. The glossy side is Mylar plastic, .001 inch thick.

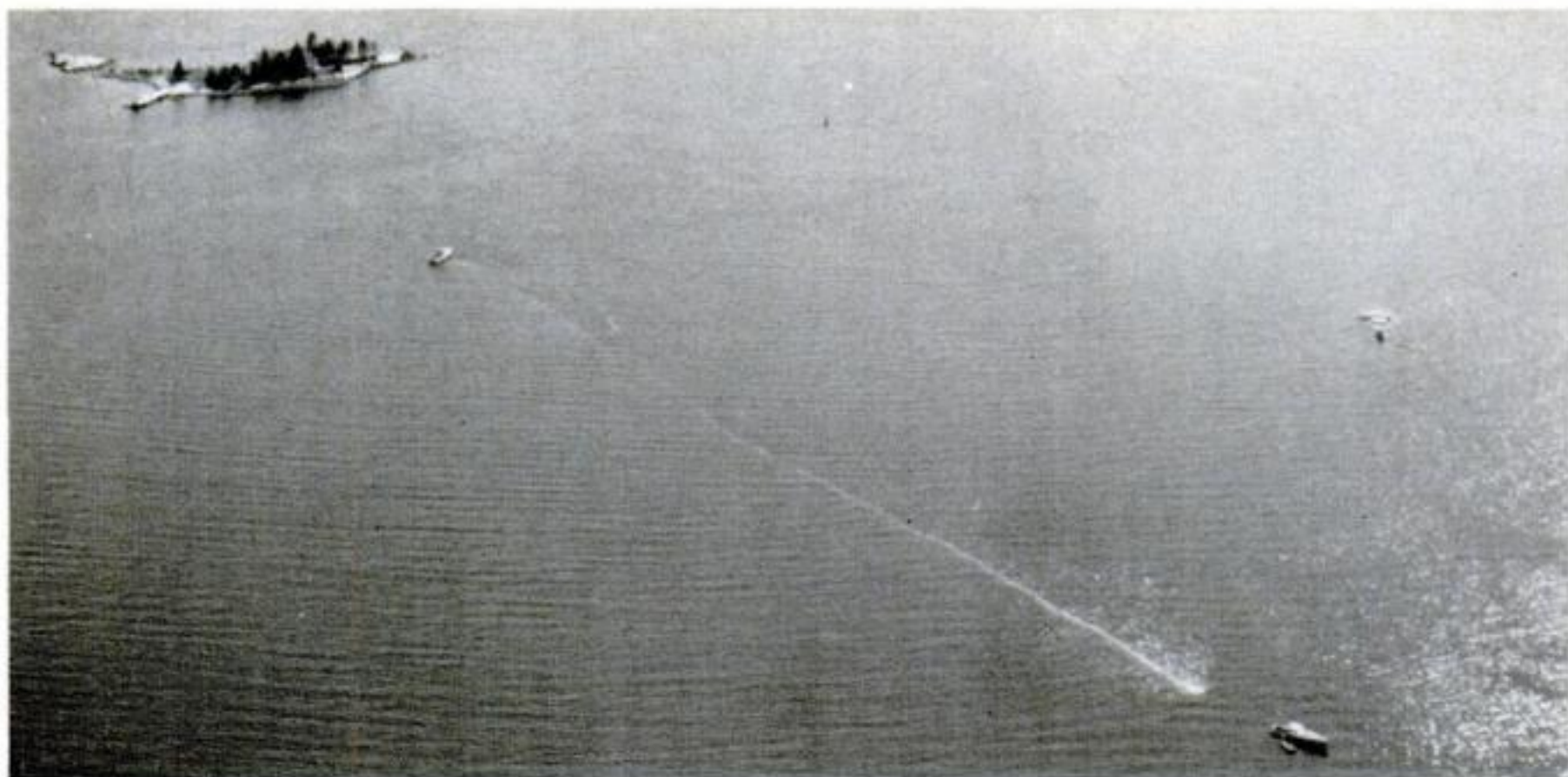
The dull side is where the recording is done. It looks just the same after it has stored a television program as it did before. It is an ultra-thin pigment of iron oxide. It has to be fantastically even and smooth. An imperfection as small as 30 millionths of an inch can cause it to miss

*[Continued on page 236]*



**TV TAPE FOR HOMES:** This is RCA's experimental playback machine, designed to show prerecorded tape on your living-room TV set—the equivalent, for sight, of a record player.





Air-bubble curtain above diverts fish toward two fishing boats off the coast of Maine.

## CATCHING FISH WITH AIR BUBBLES

Maine fishermen now guide their prey into nets by means of a curtain of bubbles. They lay a perforated hose in water too deep for nets, pump compressed air through it, and wait at either end with

seines spread. Small fish won't go through disturbed water, so the schools parallel the trail of bubbles, seeking calmer passage. The method was developed by the U. S. Bureau of Commercial Fisheries.



**FLYING FIREMEN.** Wind blasts from the rotors of a hovering helicopter drive back flames here to let a ground crew get in close to fight a fuselage fire. The technique was demonstrated at Randolph Air Force Base, Tex.



**FOR THE HANDYMAN.** Wilmer L. Wilson Jr., a farmer near Fort Dix, N. J., puts up and takes down storm windows the easy way. He has his wife pilot his tractor lift and boost him to the second-story windows of his farm house.





Perforated hose is unreeled from boat.

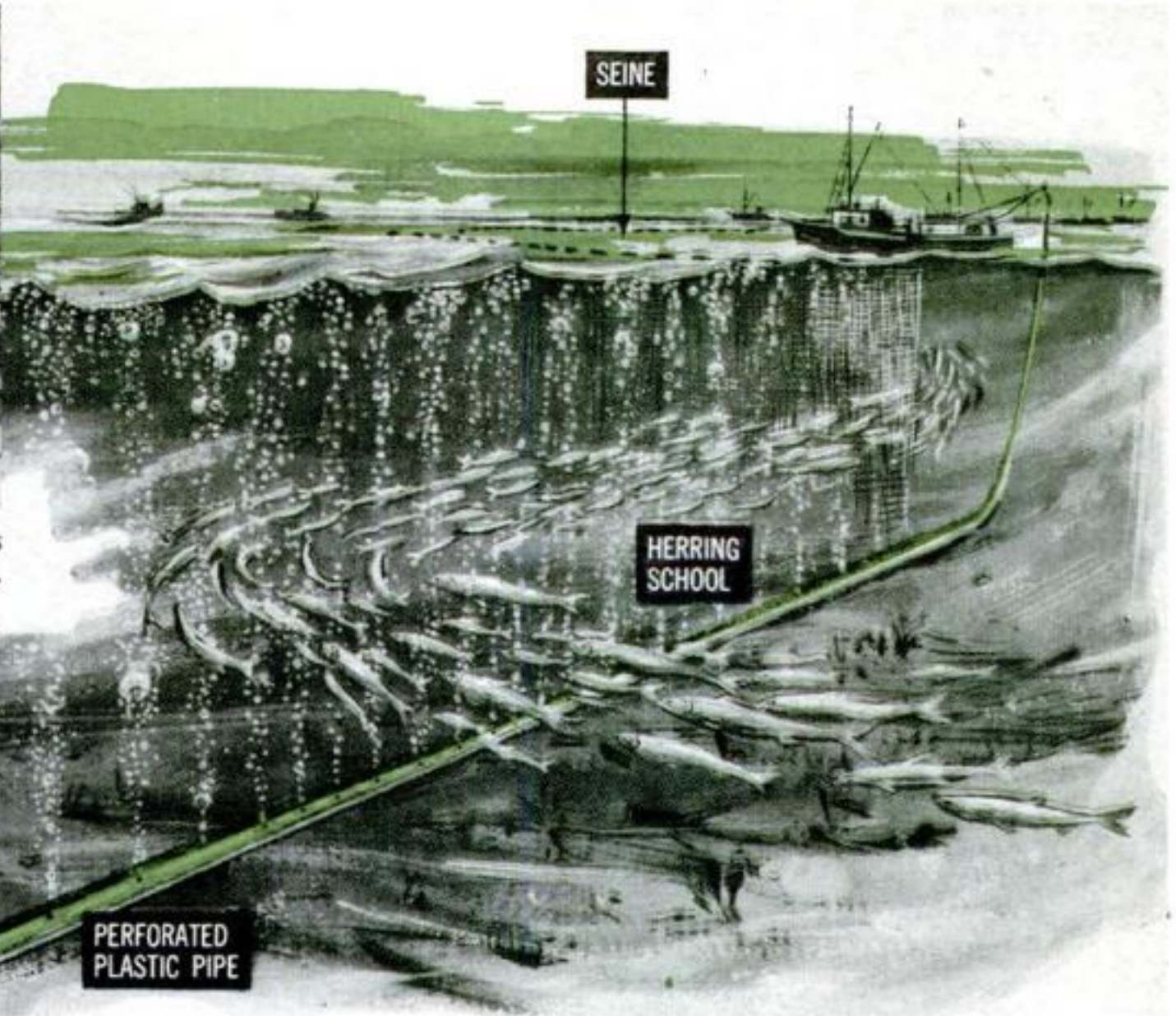


Diagram shows how air bubbles form a barrier, to send herring into fishermen's nets.



**SENATE SUBWAY.** Here is a really exclusive railroad. It runs in a two-block tunnel opened recently in Washington. The electric car is used for carrying U. S. Senators between the Capitol and their new Senate Office Building.

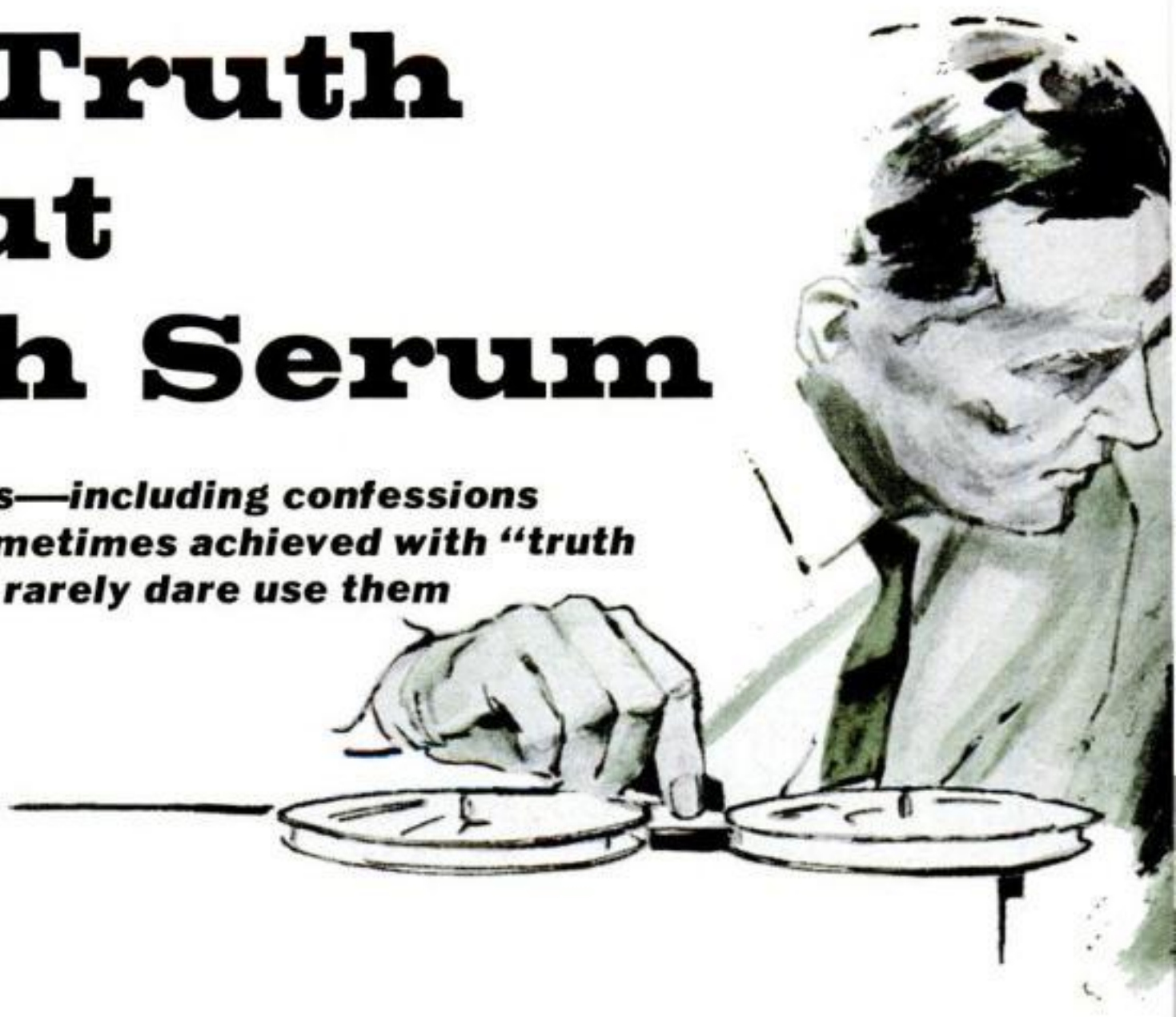


**HINDSIGHT.** The stinging tail of the Air Force's new B-52G mounts a TV camera over its cluster of four 50-caliber tail guns. The gunner, up front in the eight-jet Boeing, sees his target on a television screen, fires by remote control.



# The Truth About Truth Serum

**Spectacular results—including confessions of murder—are sometimes achieved with “truth drugs.” But police rarely dare use them**



**By  
Wesley S.  
Griswold**

**T**HOUGH there is literally no such thing as a truth serum, it keeps popping up in print.

“The Bergen County (N. J.) prosecutor’s office administered ‘truth serum’ today to the 22-year-old son of a widow who was found slain . . .”

“A self-styled amnesia victim from Georgia, who was identified last night after an injection of ‘truth serum,’ was booked in San Diego today on suspicion of murder . . .”

These are fragments from recent news stories. Reporters invented the name “truth serum” some 37 years ago, and have been using it ever since. By now, it is firmly embedded in our language. Doctors and psychiatrists deplore its inaccuracy, but you’ll often catch them using it, too.

## *What is this mysterious potion?*



It may be any one of several sedative drugs, mostly barbiturates, members of the sleeping-pill clan. It is not a serum. It does not guarantee the telling of truth.

When truth serum originally hit the headlines, back in 1922, it was a drug called scopolamine. Nowadays, it’s usually sodium amytal or sodium pentothal. Small, carefully controlled doses injected in a vein bring a person to the threshold of unconsciousness. At that point he is very drowsy and his speech is thick. He is only vaguely aware of his surroundings. One has to speak loudly to make him hear. But he can open his eyes and sit up. His brain has lost control of his thoughts, however. His natural inhibitions are gone. He says things that guilt, fear, embarrassment, loss of memory, caution, or love or hate have kept him from saying





when fully conscious with a tight rein on his thoughts.

There are no harmful or unpleasant after-effects. A person only hazily remembers anything he said or was asked while under the drug's influence. His words are often tape-recorded and played back to him later.

The scientific name for this condition is "barbiturate narcosis."

### *What is it used for?*



Barbiturate narcosis has been a great help in restoring the lost memories of amnesia victims. Psychiatrists find it valuable in helping some patients to understand, and thereby to recover from, psychological disturbances. During World War II and the Korean War, it was important in the treatment of battle fatigue and hysterical paralysis.

For police work, though, truth serum is generally shunned. Most big-city forces won't touch the stuff. But, as occasional news stories prove, others are not so leery of it.

### *How much truth does truth serum induce?*

Quite a lot. But it is far from being infallible. Medical men and criminologists have been experimenting with so-called truth drugs for years. They have used at least 10 different ones. Some investigators have been remarkably successful. Most have not. A survey of all findings has shown that only about half of the time could statements made by persons under the influence of these drugs be proved to be true.



Often interrogators wound up with a collection of hopelessly conflicting answers. Frequently, what the subject related in his condition of altered consciousness, as it has been called, was pure fantasy.

Sometimes, though, a drug has wrought spectacular results. When William Heirens was arrested for attempted burglary in Chicago in 1946, he was hit on the head with a flowerpot while resisting arrest. Jailed, he lay for hours in an apparent coma. Meanwhile, detectives discovered that his fingerprints matched some found at the scenes of two unsolved murders.

Police doctors suspected that Heirens was only pretending to be in a coma. To make sure, they gave him a shot of sodium pentothal. They got far more than they bargained for. Under the drug's quick influence, Heirens not only began to talk but told them that he had done the murders.

He gave many details that were known to be true. He even revealed a third killing that the police hadn't yet found out about.

Although this drug-induced testimony could not be used in court, Heirens, after he was fully conscious, was told the incriminating statements he had made and readily confirmed them. He then signed a clear-headed confession that sent him to prison for life.



*Under drug's influence Heirens admitted killings, later signed a confession.*

## *What is the legal status of truth serum?*

In the courts, as distinct from medical use, these drugs are almost always outlaws. The Bill of Rights protects every American citizen from being forced to testify against himself. Courts have held this to mean that no one can be given an injection of a drug that will make him talk unguardedly to police unless he is first told that he runs the risk of self-incrimination. If he is willing to take the chance, he must then sign a statement to that effect.

In addition, his attorney and the opposing lawyer must agree to accept whatever he says under sedation as valid testimony. Finally, the presiding judge must be willing to admit the testimony.

Such unanimous agreement hardly ever happens. Most lawyers and judges feel that the results of questioning a person with the aid of truth serum are too uncertain to be trusted. Most police departments string along.



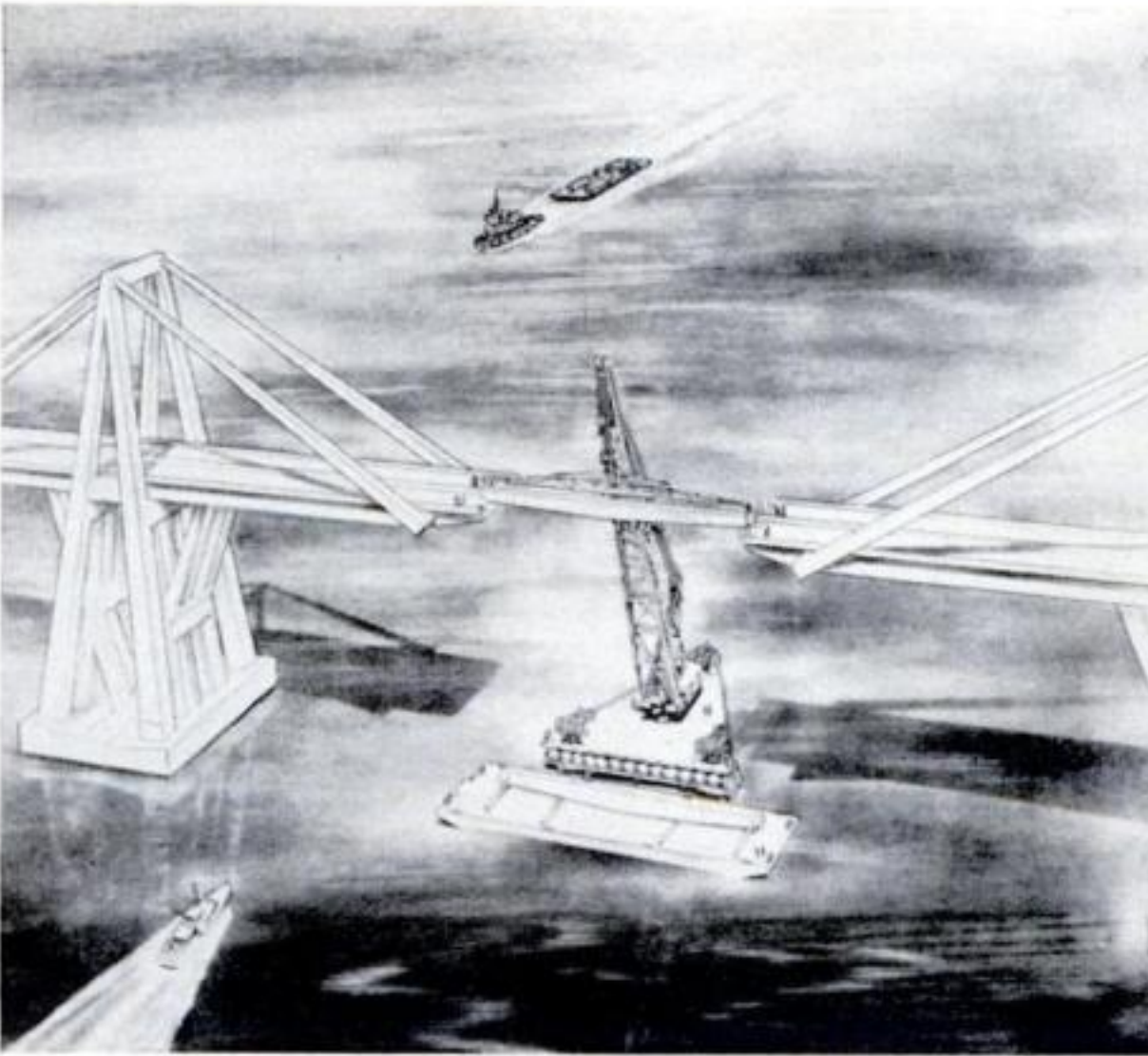
## *Has it ever determined a verdict?*

Very rarely. In 1954, for the first time in the history of federal courts, a district judge in Washington accepted testimony obtained with sodium amytal.

The contesting parties were a soldier and a girl who had accused him of housebreaking and assault. The soldier stubbornly insisted that he was innocent. The girl clung to her story. Finally, the judge asked that both be given truth-serum interviews. The result was an eye opener. The girl not only confirmed the soldier's testimony but revealed her

*[Continued on page 240]*





Drawing shows how bridge sections will be lifted into place.



Tower tested before shipment.

## GIANT MACHINE TO BUILD SIX-MILE BRIDGE

A Texas tower of the kind used in drilling for offshore oil will be a key tool in constructing a six-mile concrete bridge across Lake Maracaibo in Venezuela. The

LeTourneau island will rest on the bottom to support a 250-ton crane. When one section is completed, it will draw up its legs and be towed to another spot.

## NATO FIGHTER.

The Fiat G-91 at right won for the Italian firm an international competition sponsored by NATO for a light tactical fighter. It can operate off grass strips, can be refueled and re-armed rapidly, and is highly maneuverable.

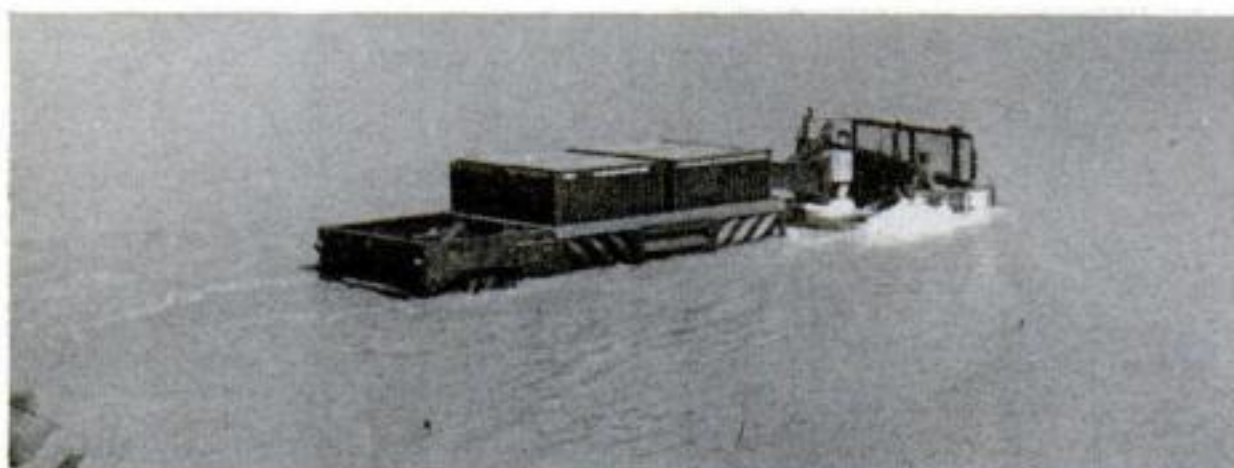


## SPACE SAVER.

This spare collapses to a one-inch pancake for stowing in your trunk. A British Dunlop tubeless tire, it is permanently mounted on a flat disk wheel. When needed, it is inflated by a carbon dioxide can. The low-cost emergency wheel, shown here with an ordinary tire, can be driven up to 400 miles at reasonable speeds.







Vehicle takes to water like a duck. Bilge pumps keep floor dry.

Clean bottom is shown as

# GOER The Truck That Goes Anywhere

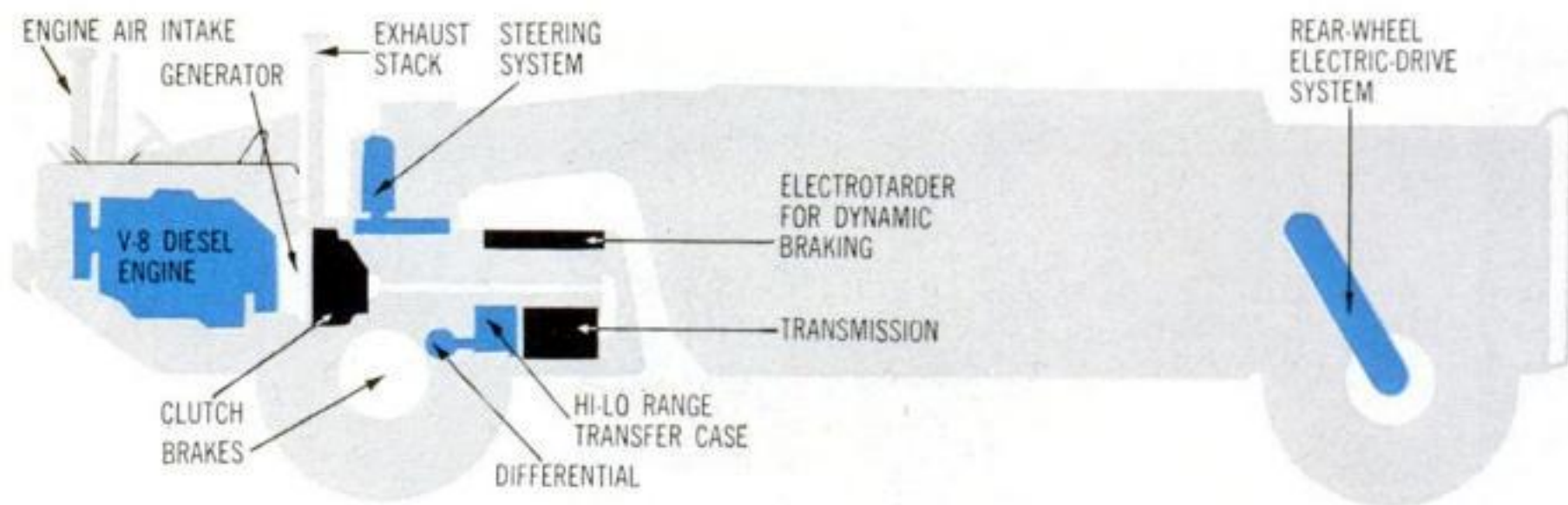
**Our Army calls it a new concept in transportation—its G.I. drivers rate it tops in trucks**

**W**HEN the military shows off a new vehicle, it is usual for observers to speculate on its possible future uses in civilian dress. Not with the GOER.

Its 15 tons of truck is made of components that have proved their worth in civilian life on commercial earth-moving and heavy construction equipment.

It carries a load of 15 tons. A tanker version holds 5,000 gallons of fuel. It can refuel five vehicles at one time at a rate of 250 gallons a minute.

In a recent demonstration held by the Armor Board at Fort Knox, Ky., off-



**EXOSKELETAL CONSTRUCTION** of the GOER is shown in the cutaway drawing above. If it

scrapes bottom, there's nothing underneath to get damaged. Tires are the only suspension.





the GOER takes ditches in its stride. Load is 15 tons.

road maneuvers and obstacle-course trials were the themes of the day. Two LeTourneau-Westinghouse-built GOERS were matched against a variety of the Army's tough-terrain vehicles—from a  $\frac{1}{4}$ -ton jeep to a 10-ton, 10-wheeled cargo carrier, with a half-track thrown in for good measure. All carried a full payload.

Challenging them were obstacles of the kind that trucks might have to cross in support of combat troops—steep hills, mud pits, a vertical wall, a hogback, a sand slope, a serpentine rock course, and a log washboard.

**The GOER outperformed them all.** On the rock course it was equaled only by the Army's agile 800-pound Mechanical Mule. The rest of the vehicles couldn't snake through it.

The hogback was impossible for most of the entrants. One truck that tried it got hung up and became a teeter-totter. For the GOER: no sweat. The sand trap was a breeze. In mud it duck-waddled its way through mire 18 inches deep without getting its belly dirty. Thirty inches of mud browned its bottom a little. None of the other vehicles made it through the 100-foot stretch of ooze.

Then, becoming a real show-off, the GOER took off down the road at 35 m.p.h. At Tobacco Leaf Lake it nosed down a steep embankment, plunged in with a splash, and swam across at three



**HERE'S A CAPER** you wouldn't want to try with your family buggy. For this driver it was just a lopsided bump.



**ROCK-STREWN SERPENTINE COURSE** is no problem. Tight steering lets tanker version thread its way through.



**WADDLING ITS WAY** through deep mud, the truck takes a zigzag course—right, then left.

CONTINUED

III



m.p.h., powered by the two front wheels. (A propeller may be added in future versions to increase water speed.)

**What makes the GOER go anywhere?** No one feature can take the credit. First there are the four large, almost six-foot-diameter tires that give a center ground clearance of almost 30 inches. Operating at low pressure (between 15 and 30 pounds), they act as giant shock absorbers. There is no other suspension. In a traction test, the GOER proved its sure-footedness in a tug of war with a truck of about the same gross weight, but having 10 smaller wheels and greater horsepower. The GOER triumphed.

Exoskeletal is what the Army calls the vehicle's unitized, welded construction. Turtles, lobsters, airplanes, and tanks are exoskeletal. You and your conventional automobile are endoskeletal. In your car that means that there's a frame to which flexible body and suspension members are attached. The GOER has no framework or body skeleton. It is a hollow shell in which the working parts are contained. Everything except the wheels is inboard. There is nothing underneath to get fouled by ground obstacles.

A bonus of this construction is floatability. Hollow inside, flat as a pancake on the bottom, the GOER takes to water like a barge. Its 274-hp., two-cycle diesel engine is high and dry inside its inboard, watertight compartment. Electric motors are designed to operate in water. A 125-gallon-a-minute bilge pump takes care of water that might enter the cab. The drivers I talked to said they didn't even get their feet wet going across Tobacco Leaf Lake.

Tractor and trailer units in the test-bed GOERS are connected by a yoke that can be unbolted in 30 minutes. Normally only the two front wheels are powered. There are 10 forward speed

selections and two in reverse. In first and reverse the rear wheels are automatically powered through an electromechanical drive. Electricity for this assist drive, and for the power-steering motor, comes from a 518-volt AC generator that is coupled directly to the engine.

**Wagon steering.** Maneuvering the GOER is not done by turning the front wheels in relation to the vehicle. Instead, the entire tractor unit turns with respect to the rear unit—like the front axle and wheels of a farm wagon. When the driver turns his steering wheel, an electric drive unit in the yoke goes into action and rotates the cab section in the desired direc-

tion. At 90 degrees in either direction, a cam-operated limit switch automatically stops the steering motor. With this positive-powered wagon steer, the GOER can make a 360-degree turn within its own length of 36 feet.

Another advantage of wagon steer is apparent in mud, sand, and snow. Turning alternately right and left, the driver can force the wheels around to find a better footing—duck-walking his way through. If one wheel starts slipping, he

has the further assist of a power-transfer differential. This diverts power from the wheel with poor footing to the wheel that is taking hold.

Extra braking is supplied by an electrotarder. This places a load on the generator, which is in line with the engine. Its effect is the same as using the engine as an added brake.

When the GOER tied up its bag of tricks by swimming the lake, one interested spectator, Lt. Gen. Arthur G. Trudeau, Chief of Army Research and Development, looked pleased. He had the answer to a previous complaint concerning heavy trucks, for which off-road mobility is claimed because they can "go across pasture land—if it isn't too damp."  
—Herbert O. Johansen.



**GOER CAB** has standard truck operating controls. Shift levers are the same. A driver needs no special training to run it.





Plane approaches line on balloon at 145 m.p.h.



... lifts man attached by harness on other end.

## AIR-SEA RESCUE ADAPTED TO FAST PLANES

A new method of swift rescue from the sea is being developed by the Marine Corps. It employs a nylon line suspended from a helium-filled balloon and hitched at the other end to a harness around the

man to be saved. A special yoke mounted on the nose of the plane intercepts the line and winches the man into the craft. Here it is being tried, for the first time, over dry land at Quantico, Va.



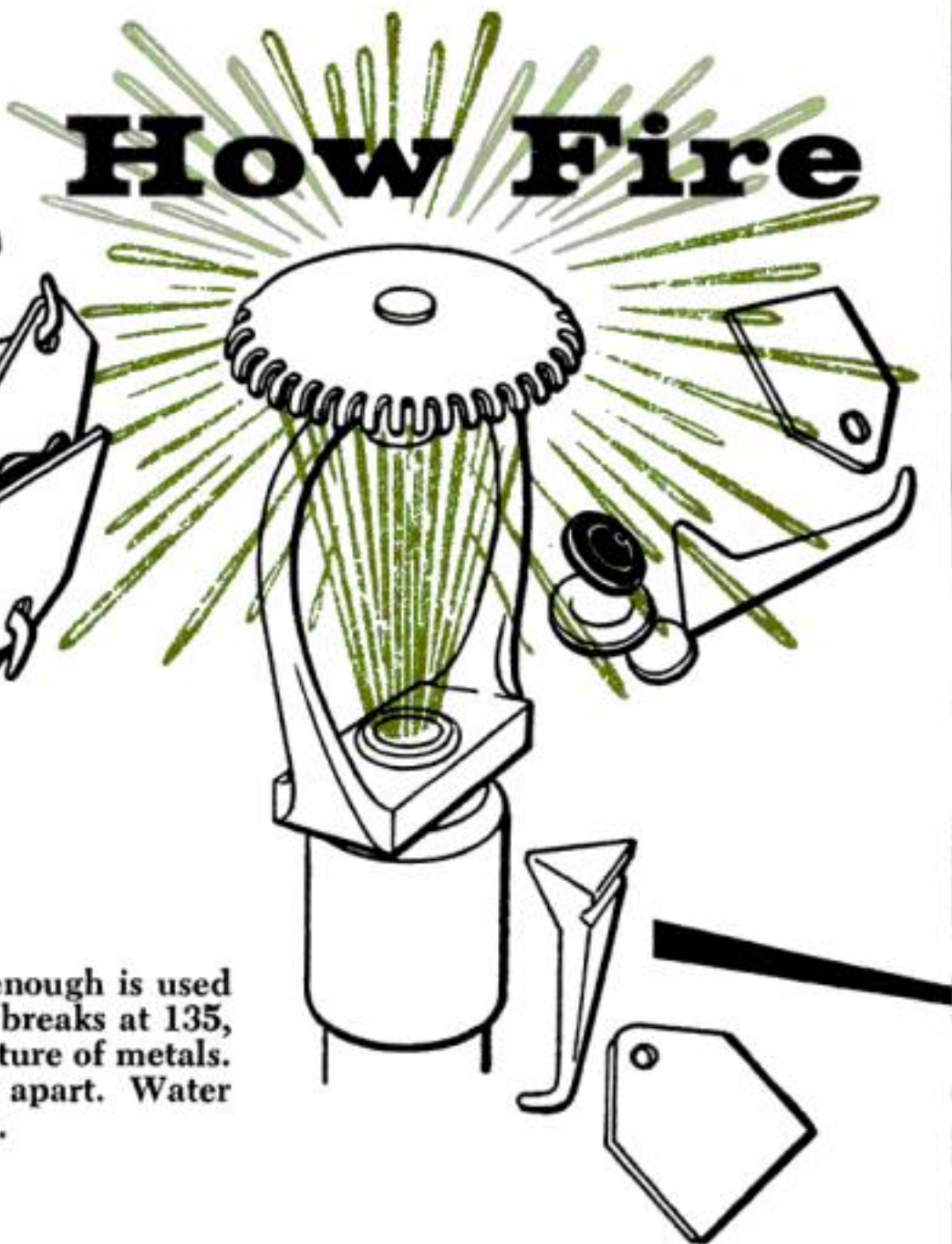
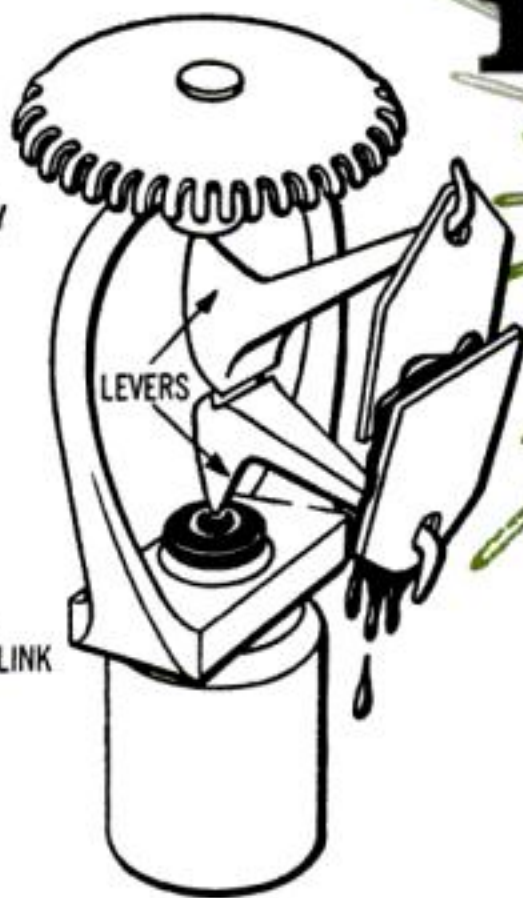
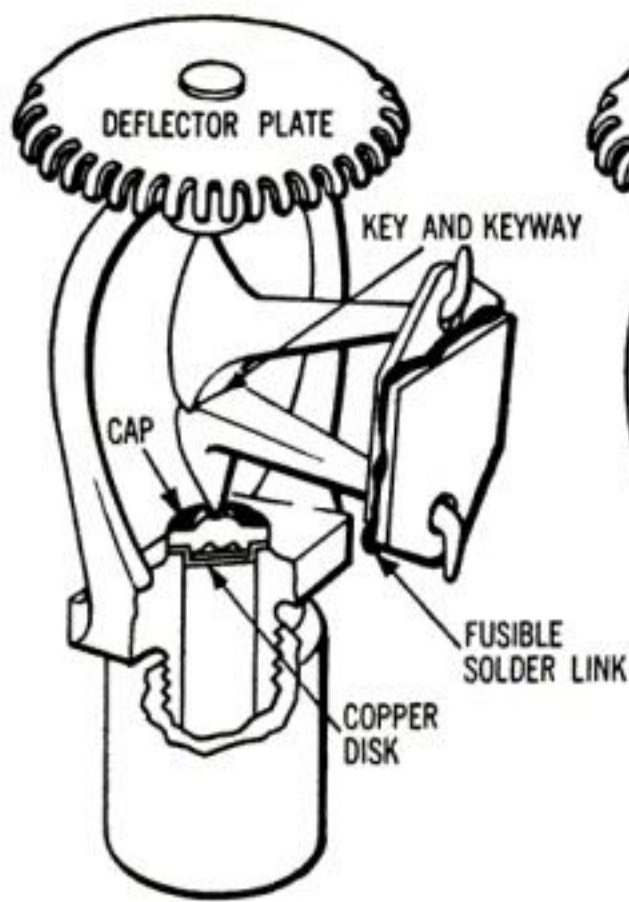
**BRITISH RACE TRACK.** Here's a combination crossover and interchange on the new London-Birmingham Motorway (from left to right in the photo). There is no speed limit on its 90 miles of dual lanes. Cars on it have hit 157 m.p.h.



**SWIFT BEAN PICKER.** This machine harvests beans in half the usual time. Rubber fingers lift the pods and a blade cuts the stems—an operation that used to take three steps. Cornell scientists built the device to reduce costs.



# How Fire

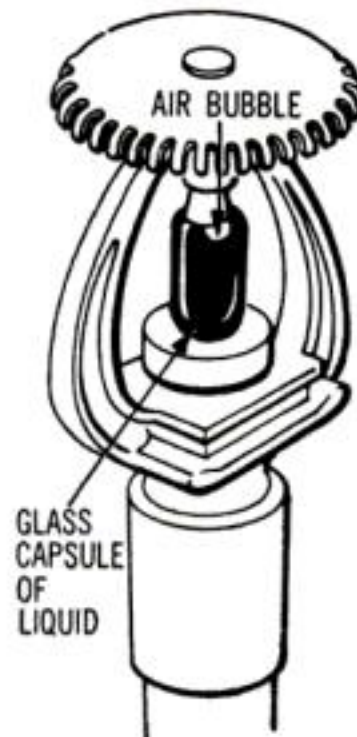


**A FUSIBLE LINK THAT MELTS** when a fire gets hot enough is used on most sprinkler heads. Made of solder, the link breaks at 135, 150, 160, or 165 degrees F.—depending on its mixture of metals. Two levers, no longer held under tension, fly apart. Water pushes a disk and a cap aside as it spurts upward.

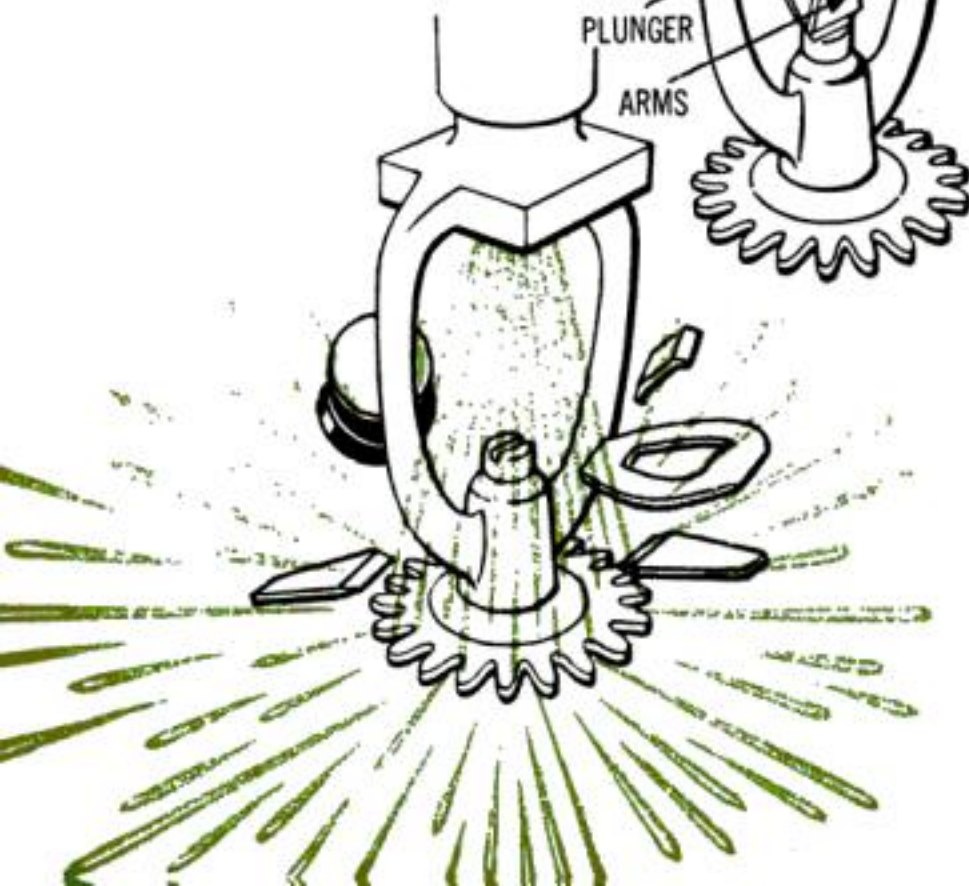
## How fire opens a sprinkler head

**A TABLET DISINTEGRATES** in one make of head. The compressed powder changes to liquid, then to gas when overheated. Mixture of chemicals determines disintegrating temperature.

A plunger moves into the space left by the disappearing tablet. This frees two arms held under 500-lb. pressure. The arms shoot outward and release the head's cap and disk. Water gushes down on deflector.



**A GLASS CAPSULE BURSTS** in another make of head. Heat expands a special liquid until there is no air space left and the glass shatters. Bursting temperature is set by filling a capsule with liquid at the bursting temperature. As the liquid cools (and contracts), a bubble appears. The higher the bursting temperature, the larger the bubble. When the capsule goes, cap and disk pop off as the water rushes out against the deflector.





# Sprinklers Work

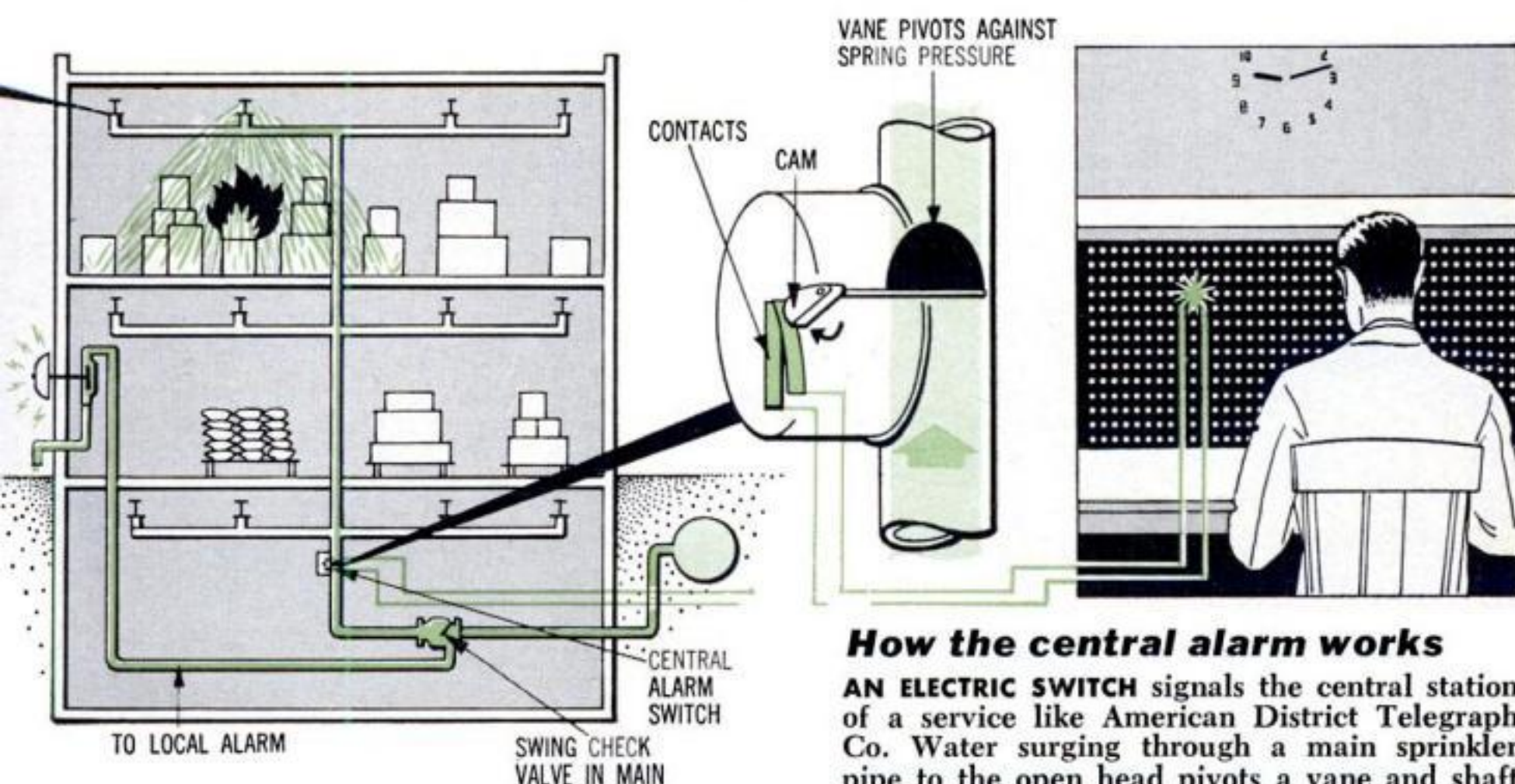
**A**BOUT 400,000 people have died in building fires in the past 60 years. Only two were in buildings protected by automatic sprinklers. Both were smokers who dozed off and suffocated; the smoldering material around them never got hot enough to set off a sprinkler.

A completely automatic system does three things almost simultaneously: It sprays water on the fire, rings a bell in the building, and alerts a central office or a fire house, or both.

The "wet" type shown here is the most common. Water stays in all the pipes,

ready to burst out instantly at a rate of 500 to 750 gallons per minute. A "dry" system (used where water might freeze) has compressed air inside. When a head fuses, the air escapes, opening a valve that lets water flow through the pipes.

The first automatic head was patented in 1874 by Henry Parmelee of New Haven, a piano maker. It had no deflector—this was added eight years later by Frederick Grinnell of Providence. In 1951, deflectors were reshaped to shoot a fine spray directly downward, making sprinklers one third more effective.

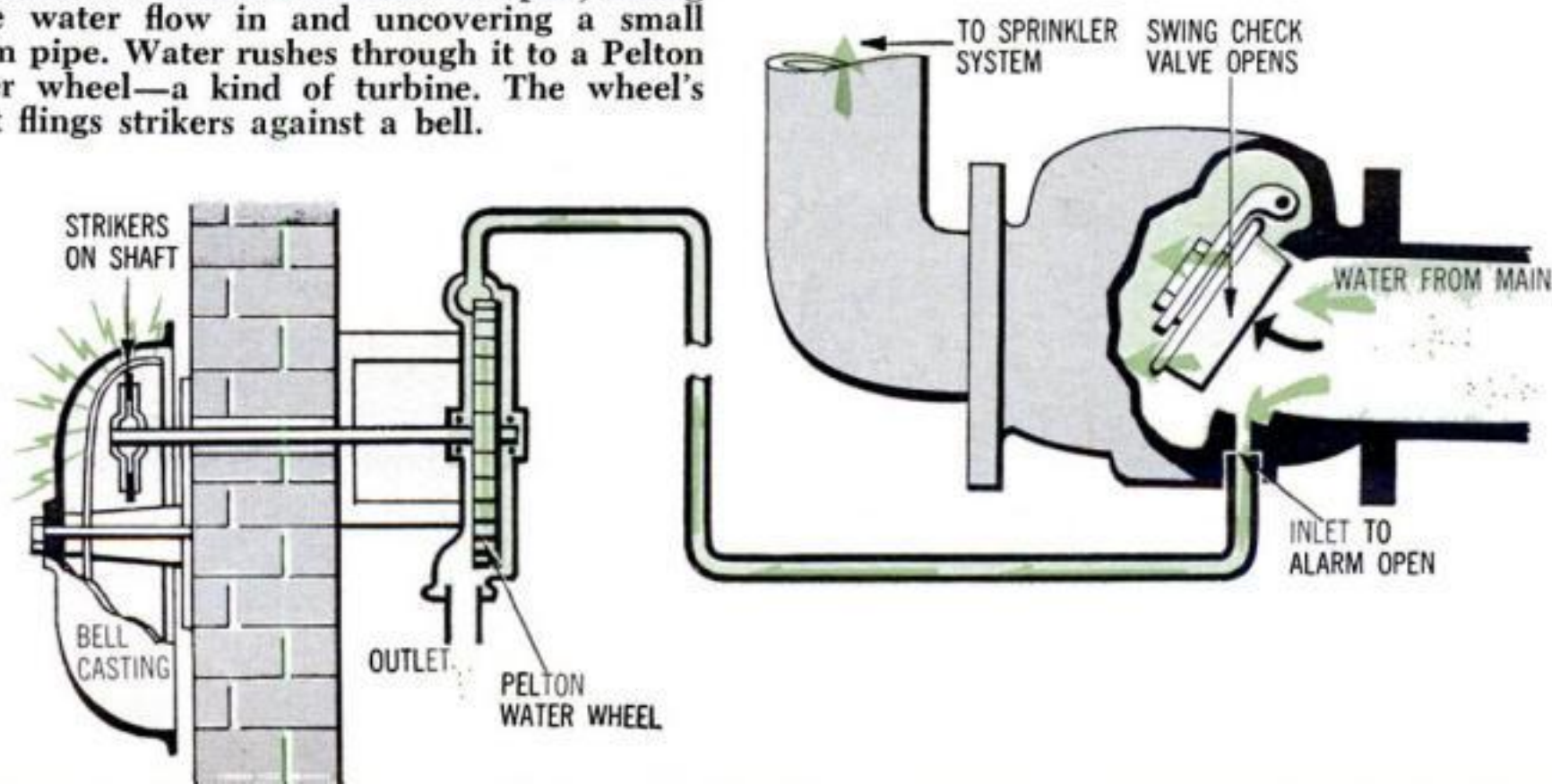


## How the central alarm works

**AN ELECTRIC SWITCH** signals the central station of a service like American District Telegraph Co. Water surging through a main sprinkler pipe to the open head pivots a vane and shaft against spring pressure. A cam atop the shaft pushes two contacts closed. The alarm signal automatically travels through the central station to the appropriate local fire house.

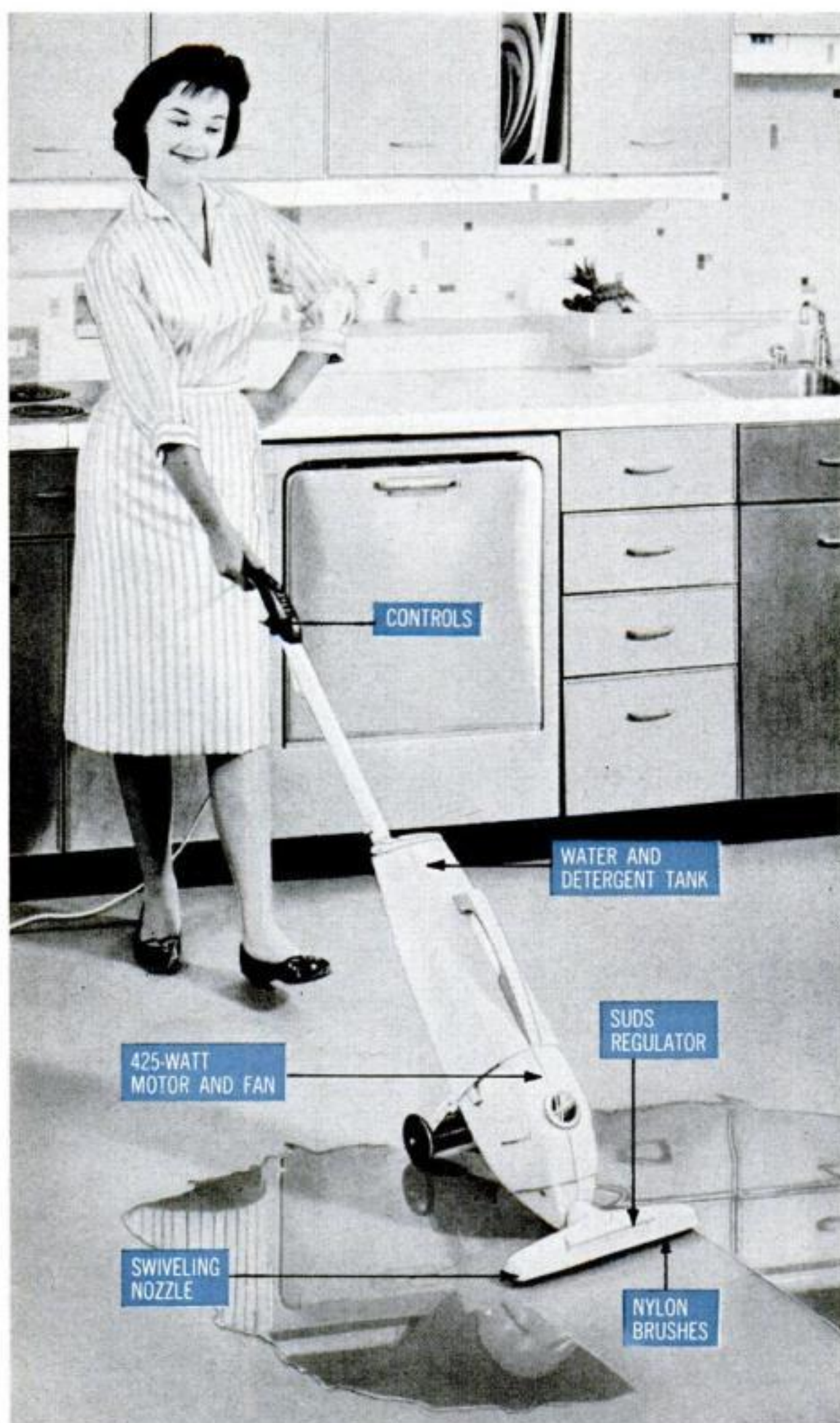
## How the local alarm works

**A STREAM OF WATER** powers mechanical alarms on the walls. As water pours out of the open head, pressure drops inside the sprinkler pipes. This causes a valve in the main to open, letting more water flow in and uncovering a small alarm pipe. Water rushes through it to a Pelton water wheel—a kind of turbine. The wheel's shaft flings strikers against a bell.



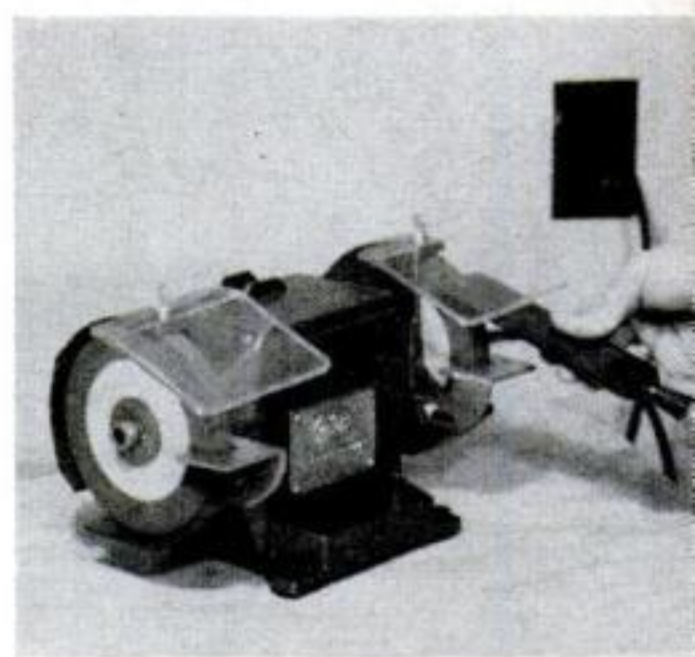


## WHAT'S NEW.....



### Electric Floor Washer

This new machine spreads sudsy water on your floor, scrubs it for you, and then vacuums it dry. Dirty water is sucked up into a separate tank so you don't use it over again. The amount of suds is regulated at the nozzle. Your only work is filling the reservoir with water and detergent and then pushing the brush to loosen dirt and grease. A switch in the handle controls the cycle. \$79.95. Hoover Co., North Canton, Ohio.



**BENCH GRINDER** is small, compact—10 inches long, 7¼ pounds—for home workshops. It's of die-cast aluminum with rubber feet and bolt holes. It sharpens shop and garden tools; sands; polishes; and wire-brushes with a change of wheels. \$19.95. SpeedWay Div.-Thor, 1421 Barnsdale Rd., LaGrange Park, Ill.



**POWER CHEST** holds a portable power driver and a selection of attachments. The case is brass-fitted mahogany. Attachments include circular saw, jigsaw, sander, rotor-hone, horizontal stand, table, mixer, bits. Complete, \$354.50. Black & Decker, Towson, Md.





## Snap-On Tools Fit Power Drill

A twist, a snap, and these new tools lock into place on a power drill. Four of the line have been announced initially: a five-inch circular saw, jigsaw, orbital sander, and hedge trimmer. Wall holders (shown in the photos) are available for each. They can be fastened together in a

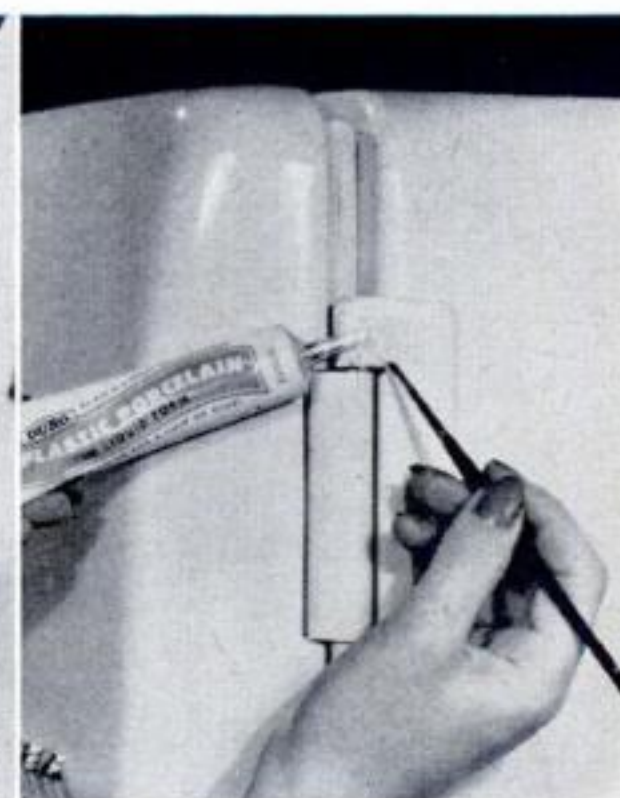
single unit for hanging inside a cabinet door, on your shop wall, or on a perforated panel. The Snap/Lock saw and sander attachments sell for \$16.95, the trimmer for \$19.95. They fit Skil quarter-inch drills (\$16.95) and some other makes. Skil Corp., 5033 Elston Ave., Chicago.



**SPRAY PACK** consists of a pushbutton-valve head, jar for paint or other liquid, and replaceable aerosol can. It uses any liquid you thin to the consistency of light cream. Sprayon Jet Pak complete, \$3.95; refill, \$1.79; extra jar, 15 cents. Sam Flax, 25 E. 28th St., NYC.



**SHINE BOX** with foot rest now houses this electric shoe polisher. It's made of dovetailed beechwood, sits on short legs. With plug-in motor unit, two brushes, and buffer, it sells for \$23.50; box alone, \$4.50; shine kit without box, \$19.95. Ronson Corp., Woodbridge, N.J.



**LIQUID PORCELAIN** comes in tube for repair and touch-up of fixtures and appliances finished in white porcelain. It mends breaks and worn spots on refrigerators, ranges, cabinets, and bathtubs. 97 cents. Mrs. Dorothy Damar, 769 Damar Bldg., Elizabeth, N. J.

CONTINUED

117

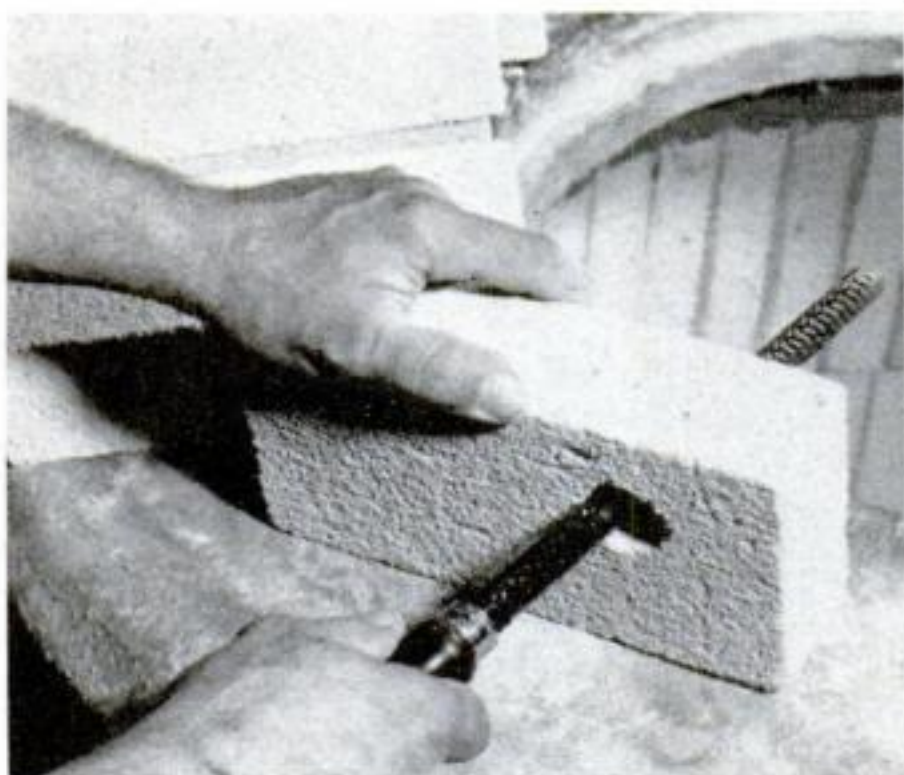




## **New Small Cycle Has Snappy Pickup**

This lightweight Super-10 is Harley-Davidson's newest two-wheeler. Its 10-cu.-in. engine develops over six hp.; a five-hp. version is also made.

New intake- and exhaust-port design boosts acceleration. The two-cycle engine goes up to 100 miles on one gallon. A two-coil AC generator energizes ignition and lights. The piston and cylinder head are aluminum. The three-speed transmission has a multiple-disk clutch with 55 foot-pounds' torque capacity. Price, \$478 f.o.b. Harley-Davidson Motor Co., Milwaukee.



**NEWEST CUTTING TOOLS** by the makers of Surform files and planes are in the form of a round hand file and a drum you use in a quarter-inch power drill or drill press. Like other tools in the line, each is equipped with multiple cutting teeth with individual throats

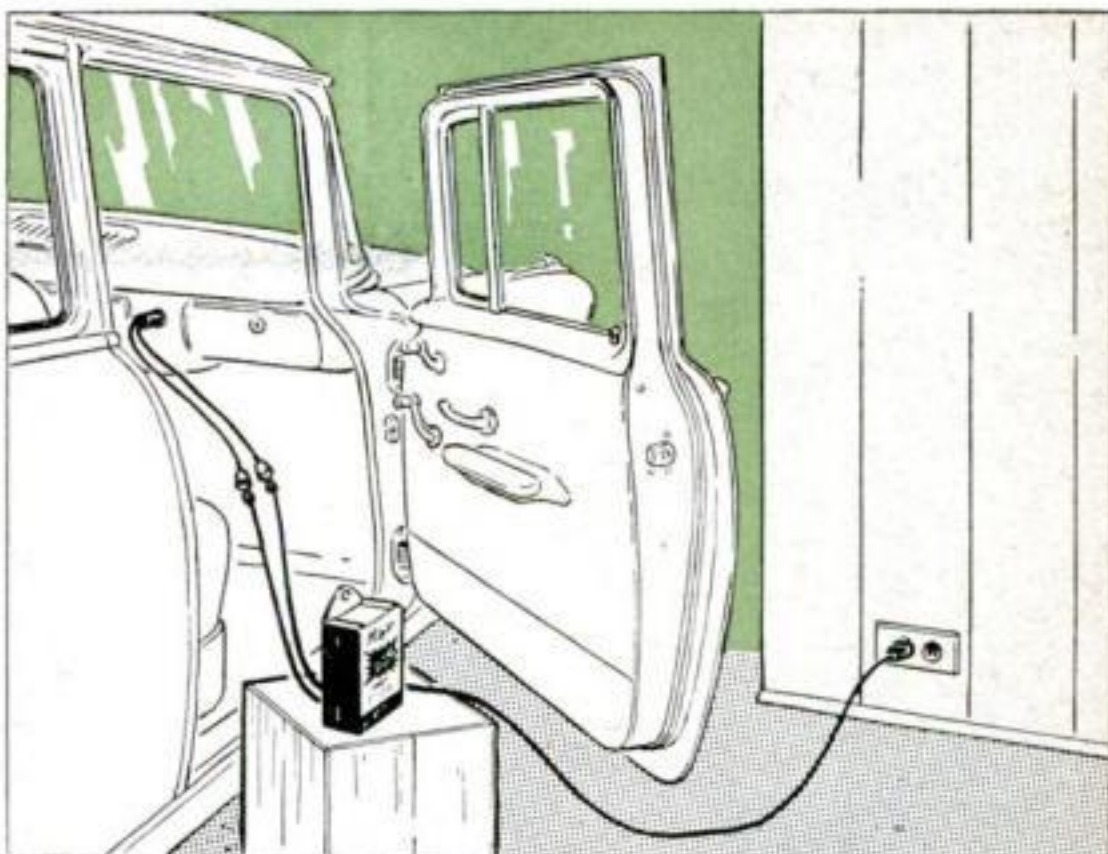


through which chips pass without clogging. They shape wood, hardboard, composition, sheetrock, plastics, and other materials. Used in a drill press, the drum is an effective router for making rabbets. Price, \$2.29 for either. The Stanley Works, 111 Elm St., New Britain, Conn.





**DASHBOARD CHARGER** works on 115-volt AC through your car's cigarette lighter. It has a dash-plug unit that you attach to a pair of clips that also can be used for connecting to the terminals of a radio, flashlight, or outboard-motor



battery. Its output, rated at two amps, tapers off as the battery is recharged. A buzzer lets you know when charging is complete. Price, \$5.98 for 12-volt model, \$4.98 for six-volt model. The Grant Co., 2735 N. Ashland Ave., Chicago.



**STOMPIN' ROCKET** shoots high into the air when your child jumps on the bulb on its launching tube. Ordinary stomps will send it 60 feet or more into the air, hard ones up to 300 feet. Launcher with three eight-inch rockets, \$2.49. Rempel Mfg. Co., Akron, Ohio.



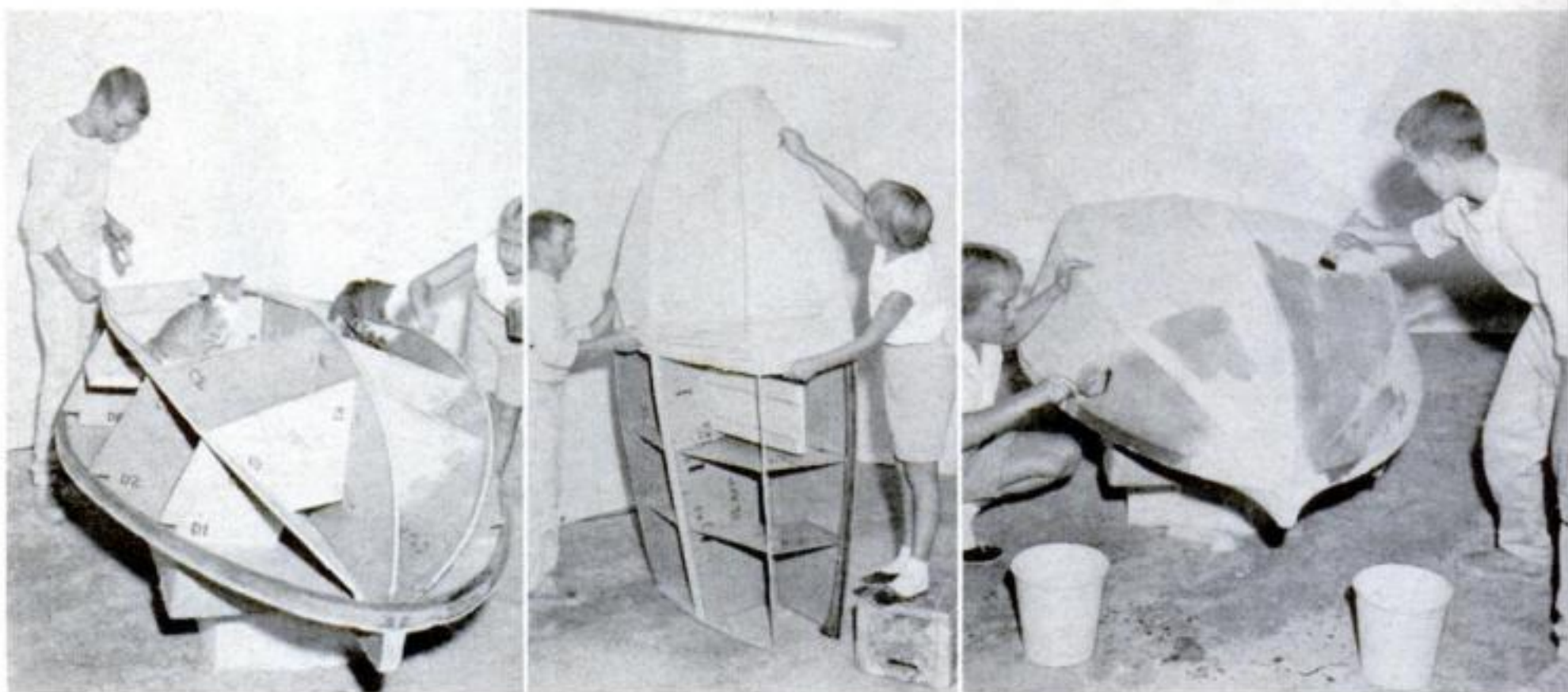
**WATERPROOFING LIQUID** becomes rubber when you spray or brush it on a car roof, tarpaulin, or hunting jacket. Rubbercote comes in pints with sprayer at \$2.95, quarts for brushing at \$5.75. Stay-Tite Products, Cleveland.

**NEW SHAVER** runs on a rechargeable battery. Plug it and its charger into a 115-volt AC outlet. Mr. Craftsman sells for \$16. Sears, Roebuck & Co., 925 S. Homan Ave., Chicago.





# WHAT'S NEW in Boating .....



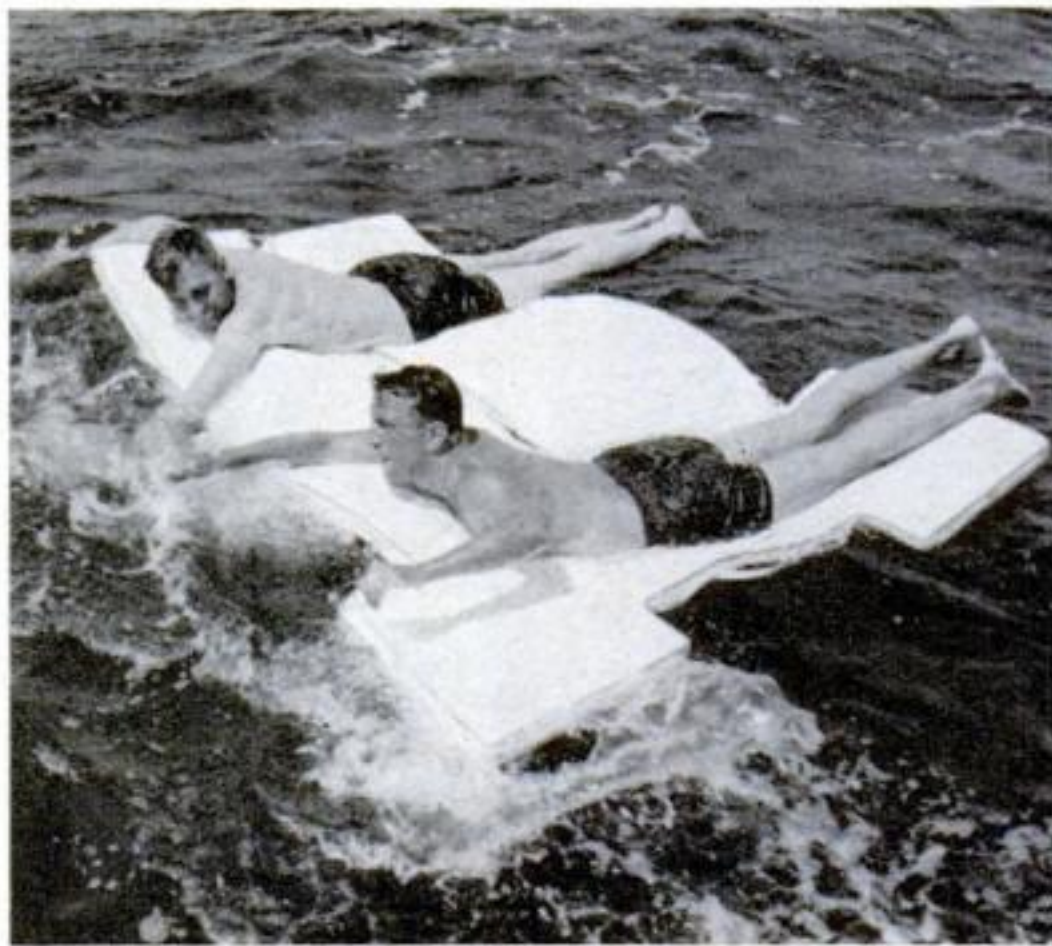
## Kit Boat Uses Cardboard Form

Corrugated cardboard, die-cut and numbered, forms the frame of a fiberglass dinghy mold. To it you fasten a wooden breast hook, transom, seat, gussets, and gunwales. Pull the cotton-jersey "sock" over this and harden it with resin. Two

layers of fiberglass and resin go on, then a wood keel and rub rails. The cardboard is pulled out. Kit for 6½-foot dink above is \$89. Also offered are two larger dinks and an outboard-runabout kit by Sock Boat Corp., Cold Spring Harbor, N. Y.



**CONVERTIBLE HARDTOP.** Tilt back the molded fiberglass top and it's easy to step out of this outboard. Five models, all white and available with rear and side curtains, fit 14- to 20-footers. Prices start at \$115.95. Seabreez Marine Products, Sugar Creek, Mo.



**CUSHIONS DOUBLE AS RAFT.** When boat cushions of Ensolite, a vinyl sponge, are thrown overboard they float. Three cushions snapped together to form a four-by-eight-foot raft easily support two people. Made by U. S. Rubber, the vinyl can't absorb water and will not burn.





### NEWEST 15-HP. OUTBOARD.

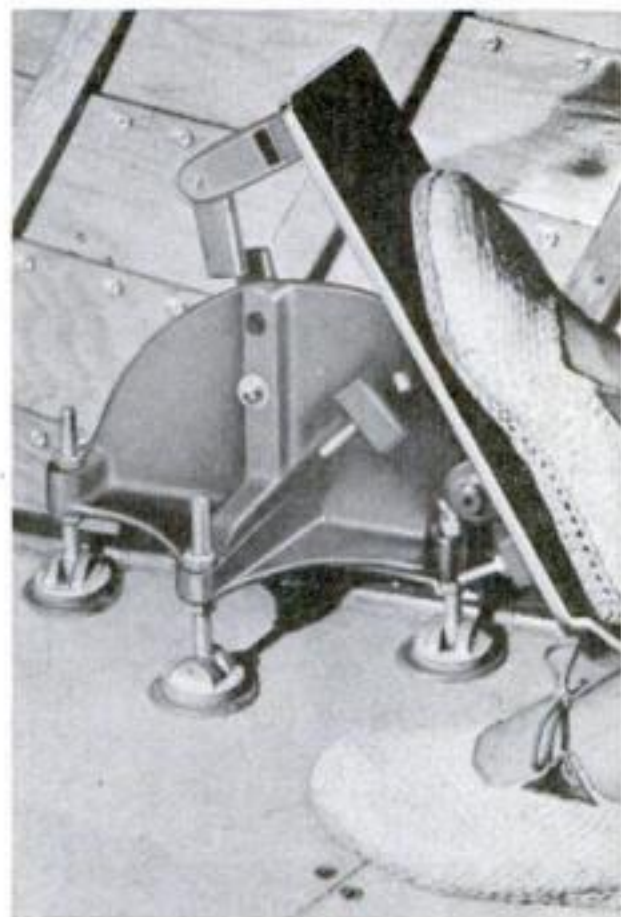
Designed for sportsmen, this Gale motor weighs a modest 77 pounds. The two-cylinder two-stroke has a rubber slip clutch and a one-piece, snap-on fiberglass shroud. Made by Gale Products, Galesburg, Ill.



**SMALL-BOAT RADAR.** This set "sees" 50 yards to five miles. Transmitter and receiver are in the 60-lb. antenna unit. Indicator (above) has a five-inch tube. Works on 12 or 32 VDC. \$1,495. Sperry Piedmont, Charlottesville, Va.



**PORTABLE FISH FINDER.** When sound pulses bounce off fish or the bottom, a light flashes on Fish Lo-K-Tor's dial. It indicates their depth down to 80 feet. Power comes from two six-volt dry cells. Lowrance Sales Co., Joplin, Mo.

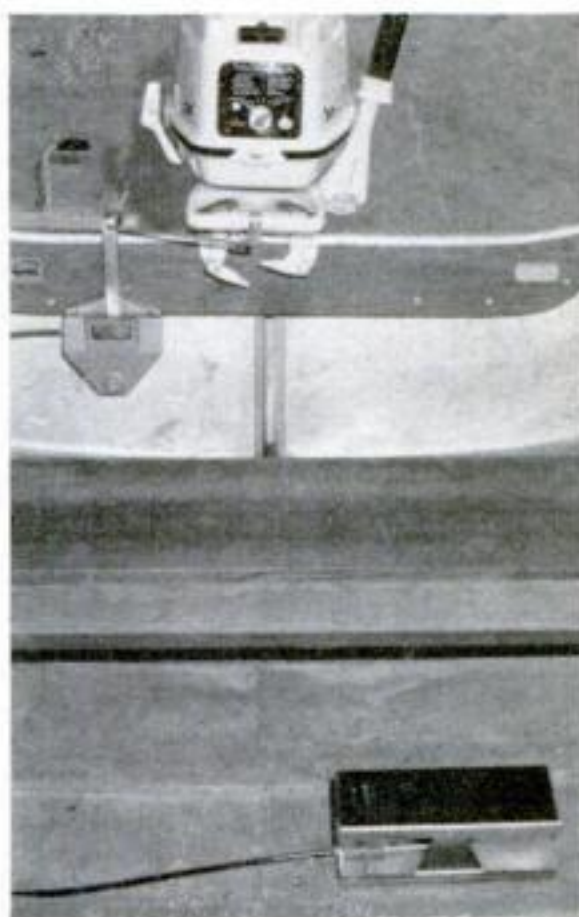


### FOOT THROTTLE.

Toe pressure speeds up an outboard with Ful-Control; heel pressure slows it. Standard controls connect to pedal, which pivots in the middle. \$39.50. Tempo Products, Cleveland.

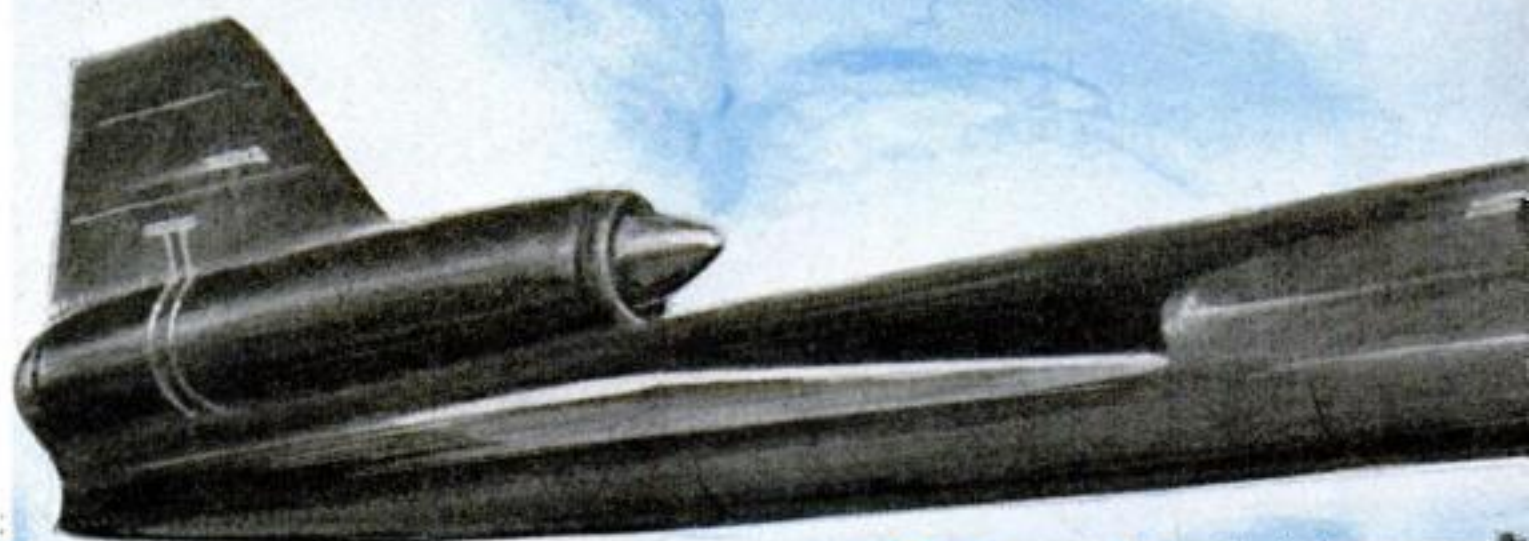
### PEDAL STEERING.

Fishermen with a Ped-A-Tiller can maneuver while trolling, yet keep both hands free. Pedal hooks onto a cable in bottom of the boat. \$19.95. Brace & Corbett, Prairie Village, Kan.





# Pluto...Deadlier Than the ICBM?



**An A-powered missile, on the way for the Air Force, promises the U. S. its most formidable weapon**

**A**LREADY the U. S. is grooming the weapon that may prove the successor to the ICBM. Its name is Pluto. An air-breathing ramjet missile of unlimited range, it will fly on atomic power. It will carry an H-bomb to any target on earth, with pinpoint accuracy, and will defy interception. It can double as a pilotless reconnaissance vehicle.

Preliminary studies have shown that the awesome weapon can be built, and

now it's official that Pluto will be developed as a weapons system for the Air Force. The newly revealed AF program is called Project SLAM, short for "Supersonic Low-Altitude Missile system."

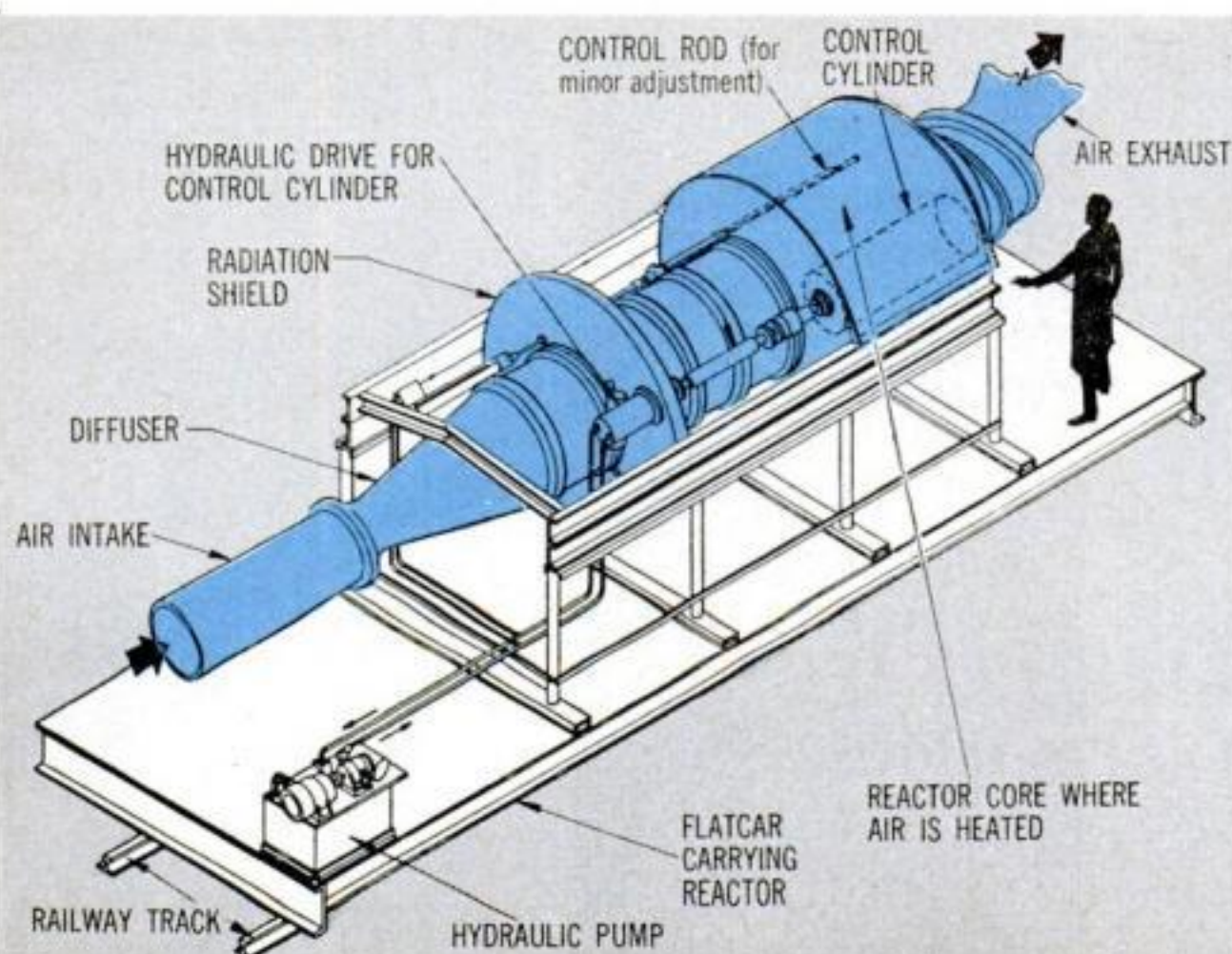
Much about Pluto is cloaked in secrecy—but facts so far released, on which our artist bases his conception of what it may look like, reveal its potency:

Its secret speed will be many times as fast as sound, requiring a cooling system for its skin. Instead of plunging out of space upon a target like a ballistic missile, it will skim the earth to its objective. Coming in "under the fence" set up by radar-warning nets, it will elude

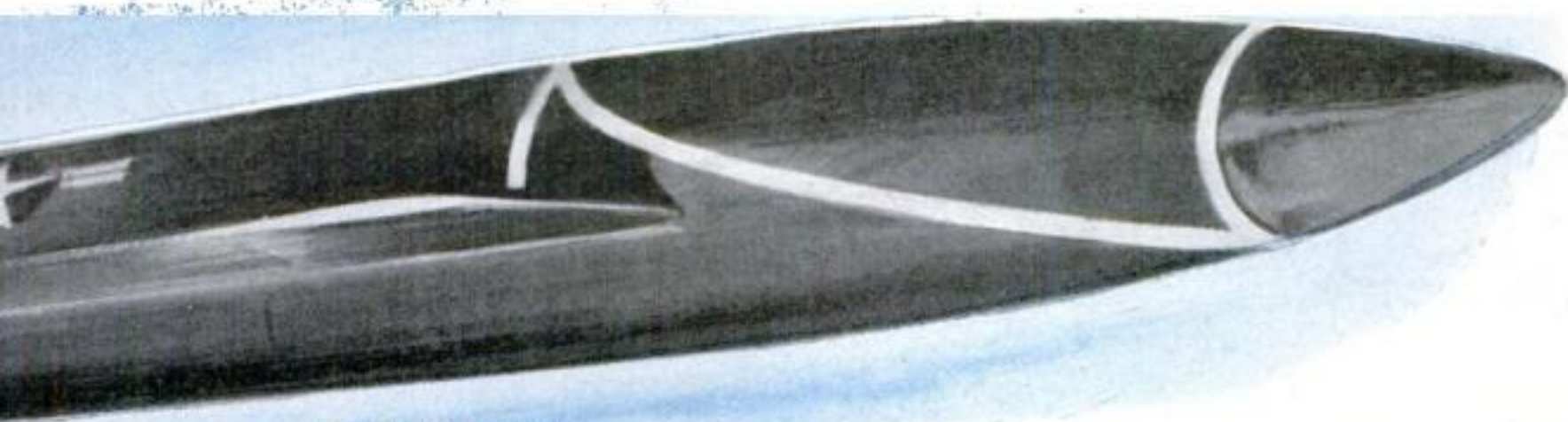
## A-engine like this one will propel Pluto

**FIRST GLIMPSE** of Tory II, trial version of atomic reactor for nuclear-powered ramjet missile, is given by AEC drawing showing it mounted on flatcar for test. Although a non-flying design, Tory II is called essentially a scale model of Pluto's engine. Main controls are eight rotating cylinders, of which one is shown.

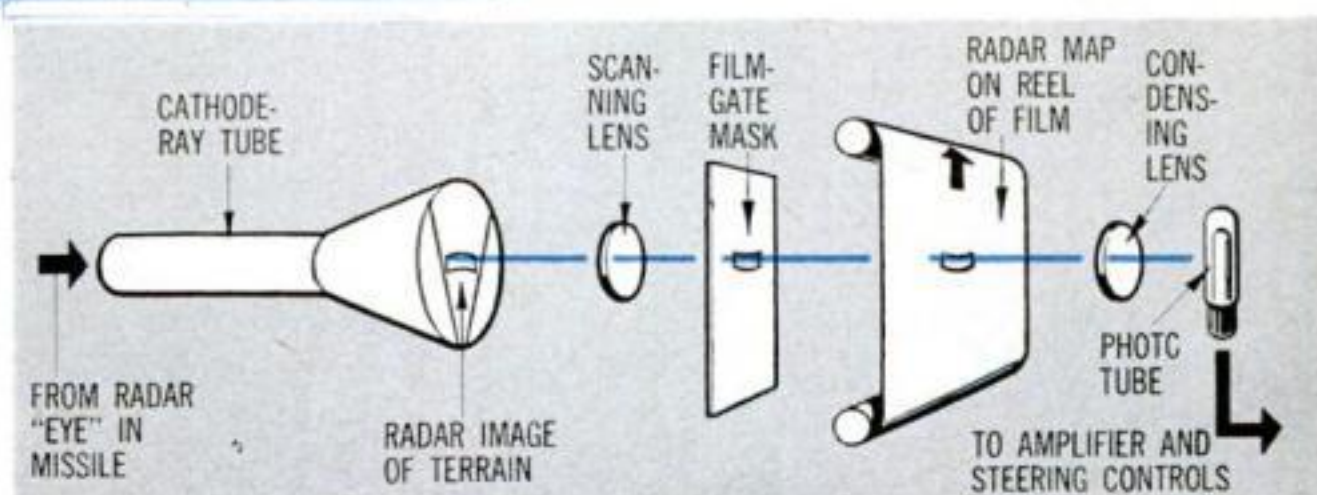
122







**To seek out its target, Pluto will read a map**



**DEFYING INTERCEPTION** by skimming low and fast, A-powered missile will use "map-matching" guidance as it nears objective. Air Force diagram shows principle: Missile's view of ground appears on screen of cathode-ray tube. Photo tube "sees" image through negative map

of terrain on unreeling film. If missile is on course, map cancels image, and no light reaches photo tube. Misalignment transmits light, and controls alter course until registry is restored. Optical "eye" and photo map could be used, but radar and radar map are preferred.

detection until too late for interception.

Chemical-rocket boosters will launch Pluto. Then its A-engine will take over. An array of guidance systems will come successively into play—beginning with inertial guidance, and ending with the advanced map-matching system illustrated above. Probably radar maps will be used. They will serve day and night; and, if map-making flights over the territory are impossible, relief models photographed by radar technique give "synthetic" radar maps almost as good.

**Preparing for the try-out.** The Air Force has been conducting its Pluto study jointly with the Atomic Energy Commission, whose key part is to develop Pluto's A-engine—a reactor that must operate at thousands of degrees. For trials, a safely remote proving ground has been established in Nevada, adjoining our A-bomb test site.

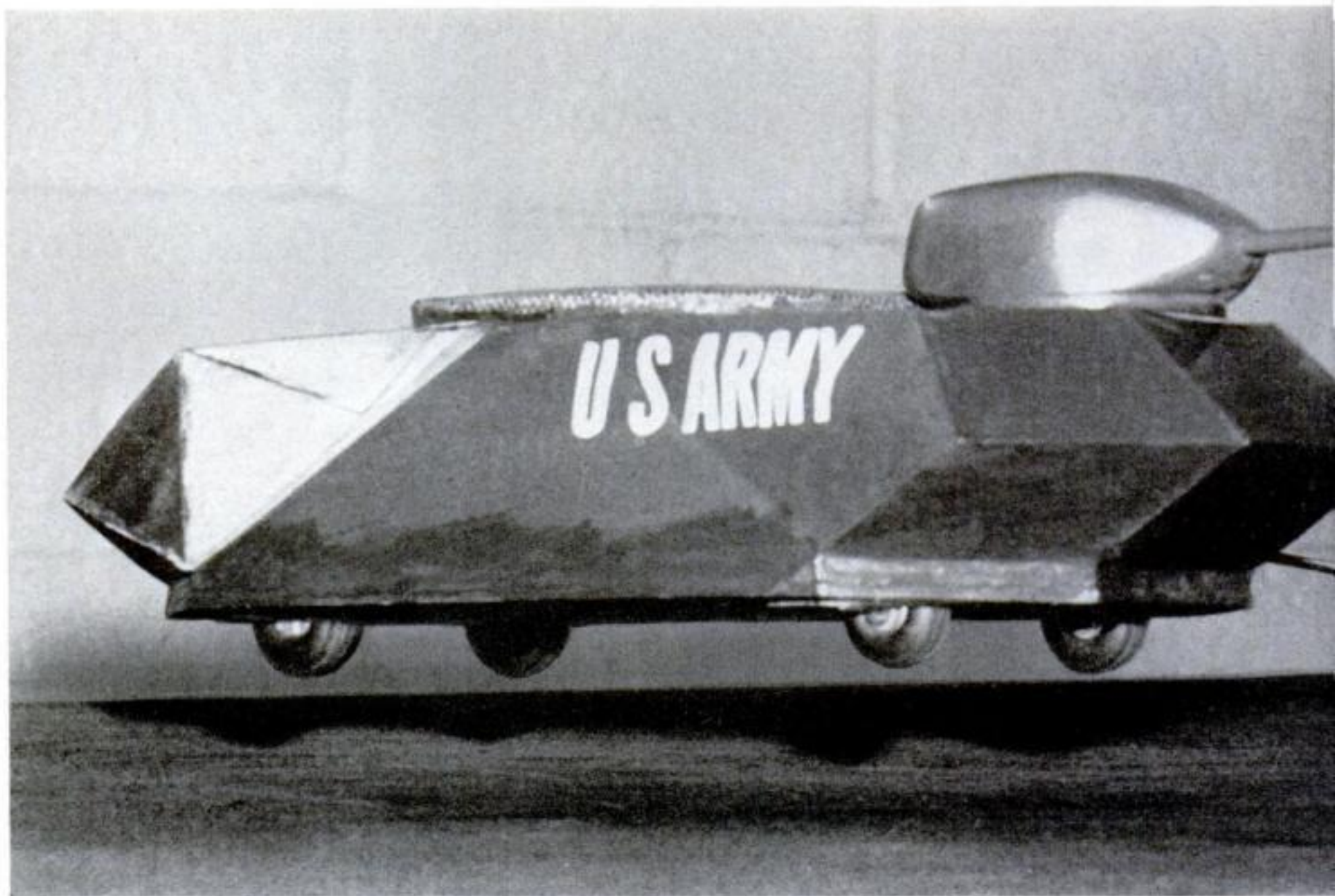
Following successful small-scale experiments, an AEC team headed by Dr. Theodore C. Merkle of Livermore Lab-

oratory is now preparing to demonstrate a sizable A-engine called Tory II. Although a non-flying version, it's said to be a scale model of the one for Pluto, and is a powerful brute itself. An output of 10,000 kilowatts of heat is only an intermediate step in bringing Tory II up to its secret "full power."

An AEC drawing now gives a glimpse of this remarkable reactor. An air intake corresponds to a flying ramjet's air scoop. Heated on the way through passages in the reactor, the air issues from a nozzle, as from a ramjet's tailpipe. Instead of control rods, Tory II's novel main controls are eight rotating cylinders of boron steel and graphite, which turn through 180 degrees to unleash or check its power rapidly.

Pluto has already proven "feasible," and progress on it is going forward "rapidly," sums up AEC Chairman John A. McCone. Adds Dr. Merkle, "I think it will put the ICBMs out of business." —Alden P. Armagnac.





Model tank rises off table top, lifted on an air cushion from axial-flow fans. It is remotely

## FUTURE TANKMEN MAY RIDE ON AIR

U. S. ground forces may soon have a tank that floats through the air. It would be based on the design of an air car de-

veloped for the Army and Marine Corps by National Research Associates and now undergoing tests. Shown at upper

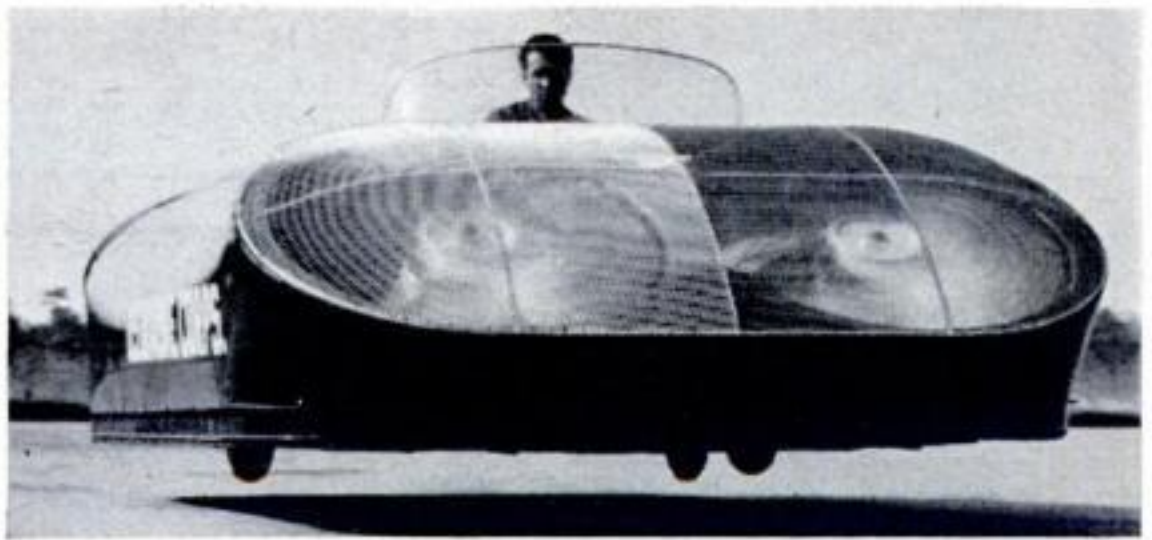
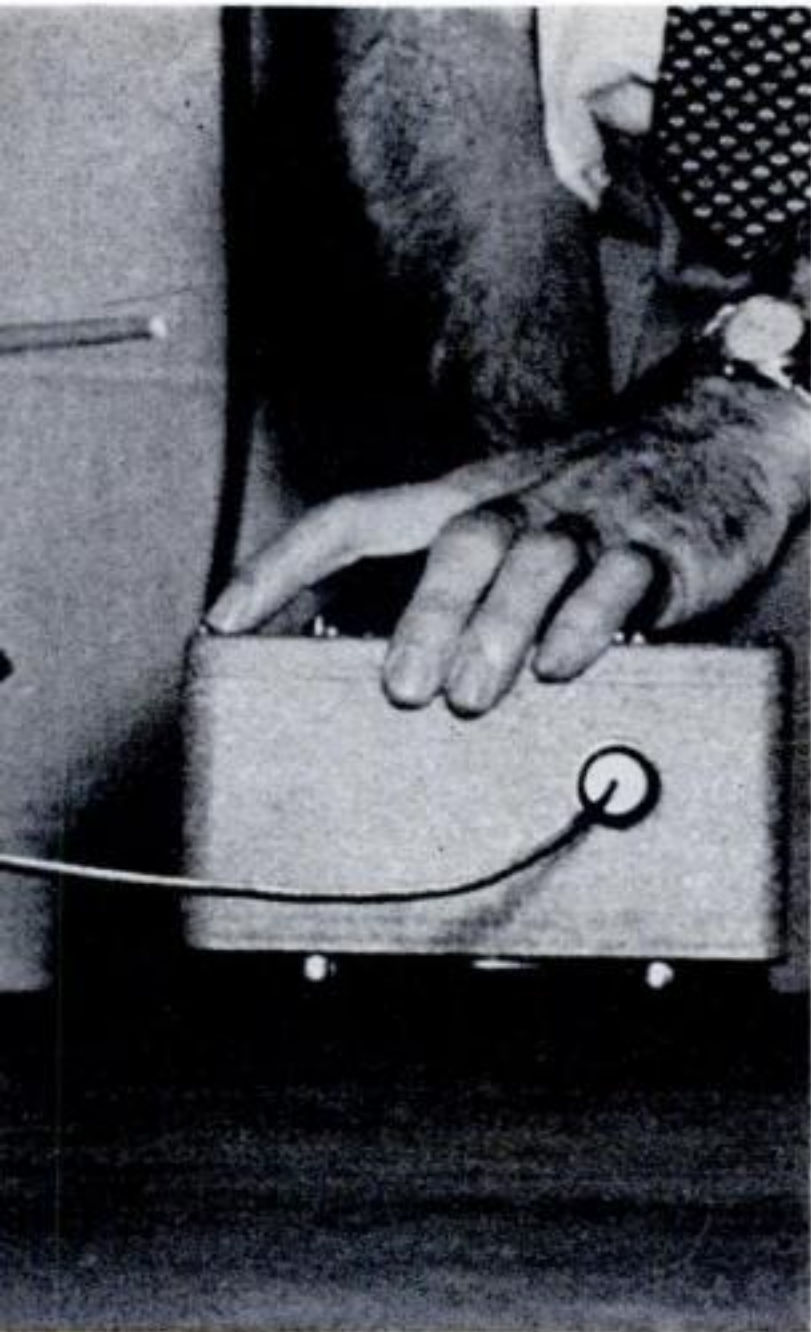


**TWO-STORY GARAGE.** Henri Ducrocq's garage at Valenciennes, France, wasn't wide enough to take his second car. With plenty of room overhead, he built a platform lift, now raises the first car to make space for the second.

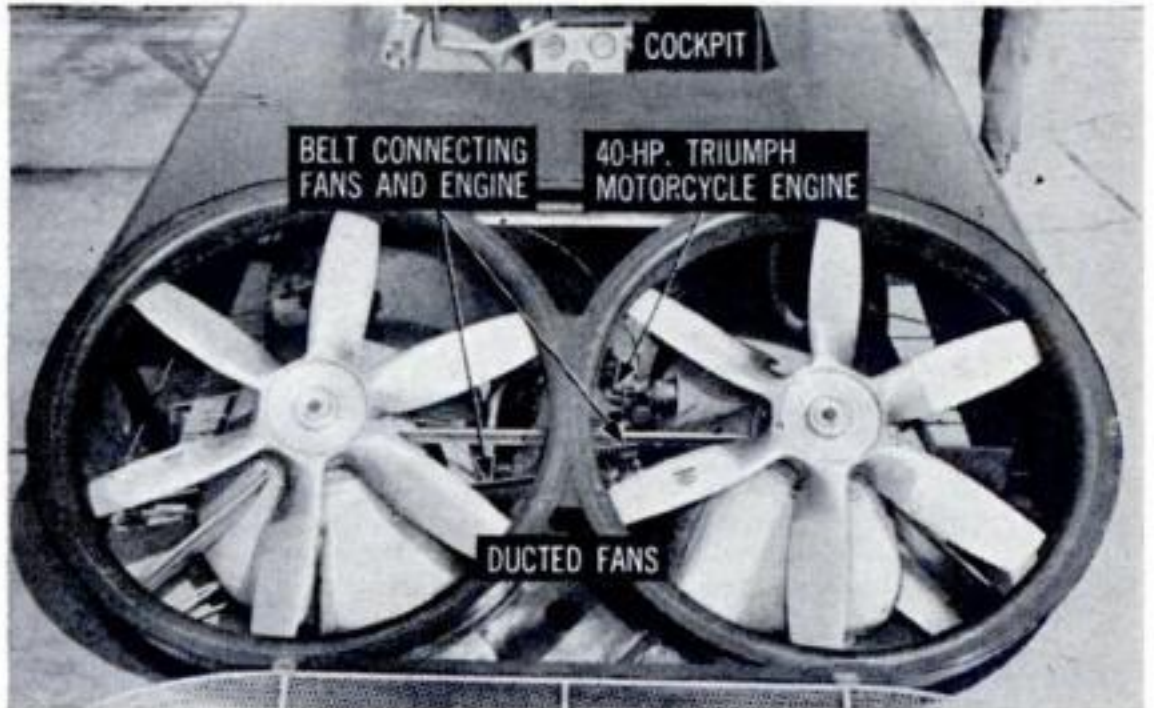


**SLOT-MACHINE PRESSURE.** Put a quarter in the slot, poke your arm into this gadget, and you can get your blood pressure. It registers on the dial. The device was shown at a Chicago exhibit of coin-operated vending machines.





Military car is fitted with twin fans at front and back.



controlled from the box at right.

Each pair is driven by belt from a small motorcycle engine.

right, this car has twin ducted fans at front and rear to propel it on a cushion of air about a foot deep. Each pair of fans is driven by a 40-hp. British Triumph motorcycle engine. The tank adap-

tation, still in model stage (left), would lift the vehicle over rough terrain, eliminating tractor treads. The idea is said to promise heavier tanks with greater maneuverability than today's fastest.



**FREE DELIVERY.** Here's how gold and platinum miners in the Bolivian jungle get diesel fuel. It's floated to them downstream on the Amazon in rubberized nylon tanks originally made for storage. When emptied, they return by plane.



**CARTNAPPER THWARTER.** A couple of Detroit inventors came up with this idea to keep customers from taking supermarket carts home. Locks are built into the wheels. They are set by magnets buried in the ground around the store.





# Village Blacksmith Makes House Calls



**By E. F. Lindsley**

**A**NYONE who thinks the village blacksmith shop has gone the way of the buggy-whip factory has only to visit the Roeker boys in their shop near Walworth, Wis. Here, Victor and his two sons, Everett and William, carry on a third-generation tradition.

It's more than a tradition. It's a thriving business, too. You won't find it in the center of town. It's down the road a piece out on the Roeker farm. There are no signs to guide you; the Roekers don't need any. Anyone within miles can tell you how to get there.

The only thing that's changed in half a century is one way of doing business. In the old days, horses came to the shop. Today, Vic can get to the horses much faster than they can get to him, so he makes house calls.

**H**E'S put his shop on wheels. In a panel truck fitted out as a mobile smithy, the Roekers travel as far as 50 miles to minister to ailing hoofs. Customers often tell Vic nothing more than a horse's weight; others send in a rough sketch of the hoof shape. Yet Vic, who started out by shoeing his own pony at the age of six, knows that the shoes will fit when he delivers them. Minor adjustments are made at the scene on the portable Roeker anvil.

Horseshoes, however, are only part of

the job. Many other delicate, loving, painstaking tasks are performed on an ancient forge in the old iron-littered, smoke-blackened shop. One day it may be a special part for a boat trailer, another repairing a farm wagon, still another welding a kid's bicycle or basketball hoop.

**P**LOWSHARES are big business. Much time is spent whacking them back into shape. Here forge welding, drop forging, and heat treating are all in a day's work. Dozens of plows are stacked and scattered about the shop, each one calling for a personal bit of attention.

Some of the plows have been cracked and split by rocks in the Wisconsin glacial soil. These Vic rebuilds, usually by forge-welding a reinforcing plate over the damaged area, neatly blending and shaping the metal to the exact contours needed for the particular soil of some farm he knows well. It is Vic's extensive knowledge of local conditions that enables him to do custom work, as different soils often require different shapes of plows.

**F**ORGE welding is no easy art. Nearly anyone with a steady hand can master an electric-arc or gas torch. Forge welding, however, starts with building a fire in the forge, using the proper coal, holding the blower to just the right draft, then observing the metal and ap-



*Traveling to the job is one of the few concessions Vic Roeker makes to modern times. Here, with their panel truck fitted out as a shop, Vic and his son Bill visit a horse that stands patiently for a retread.*



plying the flux so that finally, when heat and color tell the experienced eye that all is ready, the patch can be applied and hammered home solidly.

No scale or voids can separate the fused pieces: A good forge weld is a true marriage of metals. Not many men can make such a weld today. The Roekers have learned to treat iron and steel like a good horse: You don't flog it; you caress it.

As old as his art is, Vic is not one to shy away from modern equipment. One of his furnaces is fed by butane gas and is shaped like a long, narrow feed trough. It can handle two plows at a time.

Once started, the furnace rumbles and roars, sending flames dancing along the edges and illuminating the smudge-dark corners of the old building where shoes of long-forgotten horses cluster on overhead beams. With loving care, Vic adjusts the exposure of each plow blade to the flame, nudging and tugging gently with his tongs.

When the steel glows to just the right color, Vic swings it quickly to the power trip hammer he uses to shape and reform the blunted edge. Watching him, you see the poetry of an artisan at work. Delicately controlling the hammer speed with his foot, he guides and turns the piece under the rapid strikes of the hammer so that the glowing metal creeps and flows as if magically knowing its master's mind.

As the metal darkens, the blows grow lighter, fining out the edge, straightening a slight ripple, putting a point on the tip.

Then the hammer becomes quiet, and Vic turns the blade in his tongs, sighting and squinting along its back and edge. If he's satisfied, the blade is ready for heat-treating, grinding, the finishing touches.

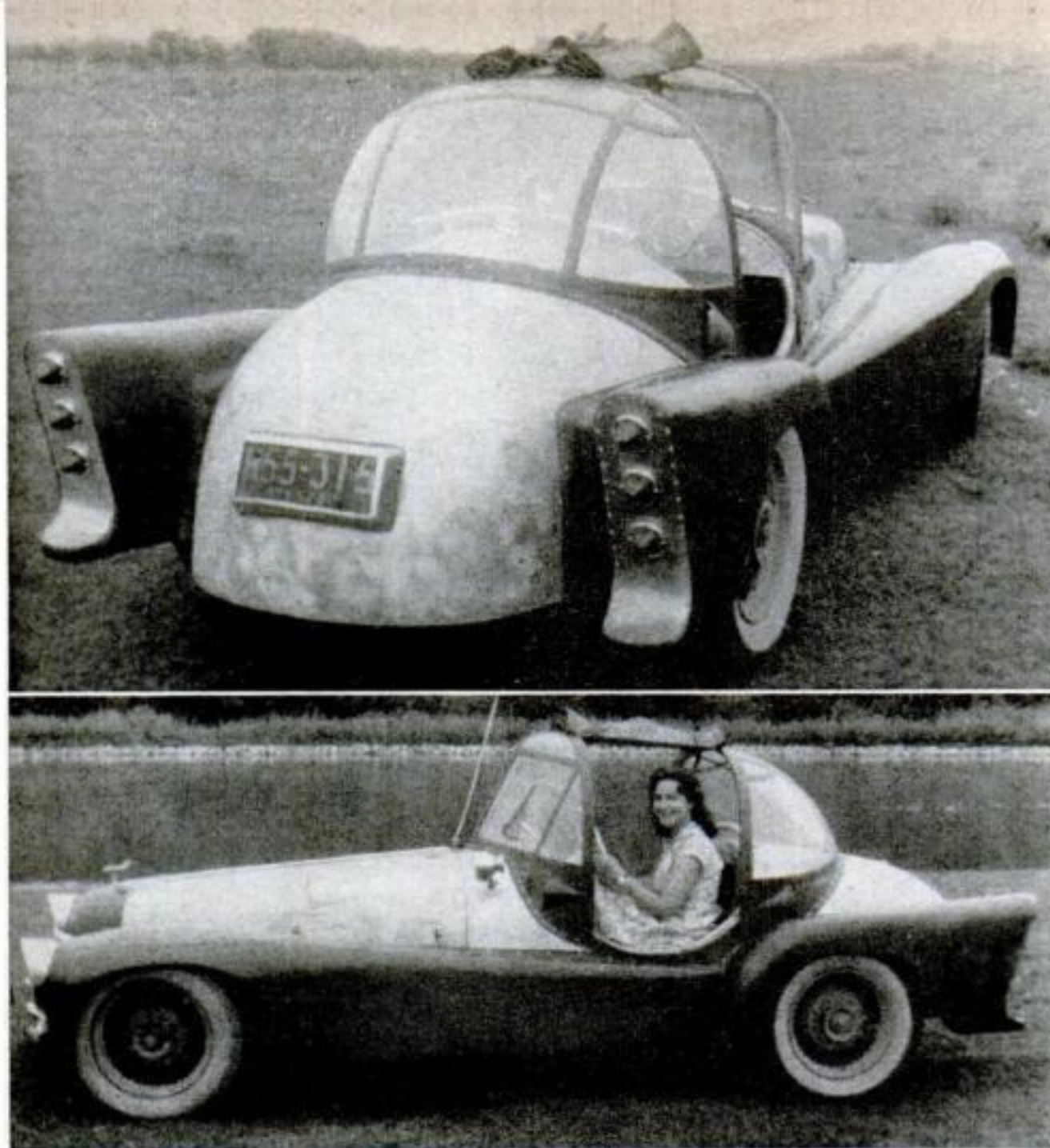
**B**LACKSMITHS are designers, too. A farmer will pull up in a chicken-scattering flurry of dust. He needs some anchor brackets for a new barn foundation, he explains hastily. He isn't quite sure of the exact shape, but they ought to have a slight bend down at the sill line.

Quietly, like his father, Everett Roeker plunges a husky length of strap into the old coal forge.

After 30 minutes at the anvil and drill press, the anchors are formed. Cutting, bending, and drilling are all done by eye. The shape is pure invention of the Roeker imagination. Yet the anchors are perfect.

Bill Roeker, youngest member of the talented clan, shod his first horse at the age of 11 and is already a first-rate blacksmith. From father to son—and on to future sons—the Roekers know that their work will be there for as many years as they care to follow it. For there's just no getting along without the village smithy.





**Hand-hammered** to shape by an energetic back-yard mechanic in Przemysl, Poland, the body panels of this car are riveted together. Triple tail-light clusters are built into the fenders, and sporty wire wheels with white-wall tires enhance the roadster's rakish lines. Roll-up curtains close the plastic canopy. Motive power is an old 67 cubic-inch Skoda engine.

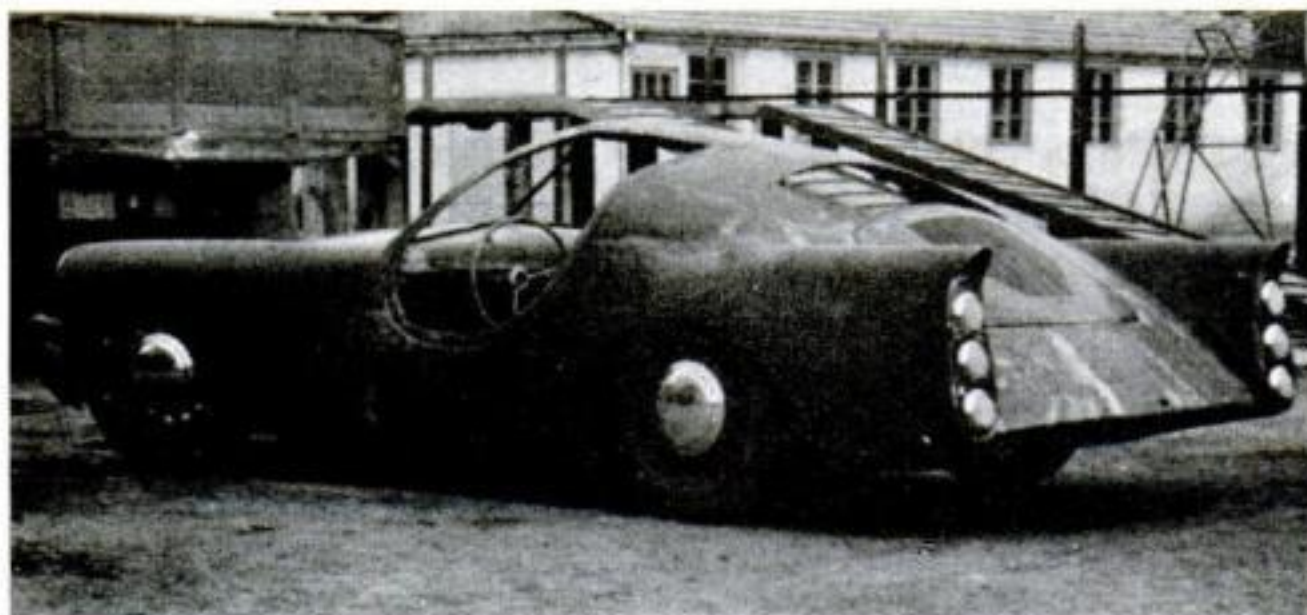
## Car-Hungry Poles Build 'Em from Junk

**O**N THE far side of the Iron Curtain, the smell and glitter of brand-new cars in auto showrooms is almost wholly unknown. Even there, however, mechanically minded young men have shown themselves willing to trade ingenuity and hard work for the dreamy joys of actually owning a car.

Pickings are poor in Polish junkyards; little is thrown away until it reaches the absolute end of the road. Blacksmithed

chassis parts and hand-hammered sheet metal are often necessary. Finding a repairable motor and transmission is usually the hardest job of all.

Many of these labors of love produce strange-looking vehicles. Frequently they show the influence of American car design. Shown here are some of the finalists in a recent contest to find the best home-made machine. Sponsored by a Polish magazine, it attracted some 180 entries.



**Sports car** will have gull-wing doors hinged at the roof when it's ready to roll. It's basically a 20-year-old Volkswagen with suspension altered to lower the body. Power was boosted by increasing cylinder bore and compression ratio, installing twin carbs. Weight: 1,200 pounds.

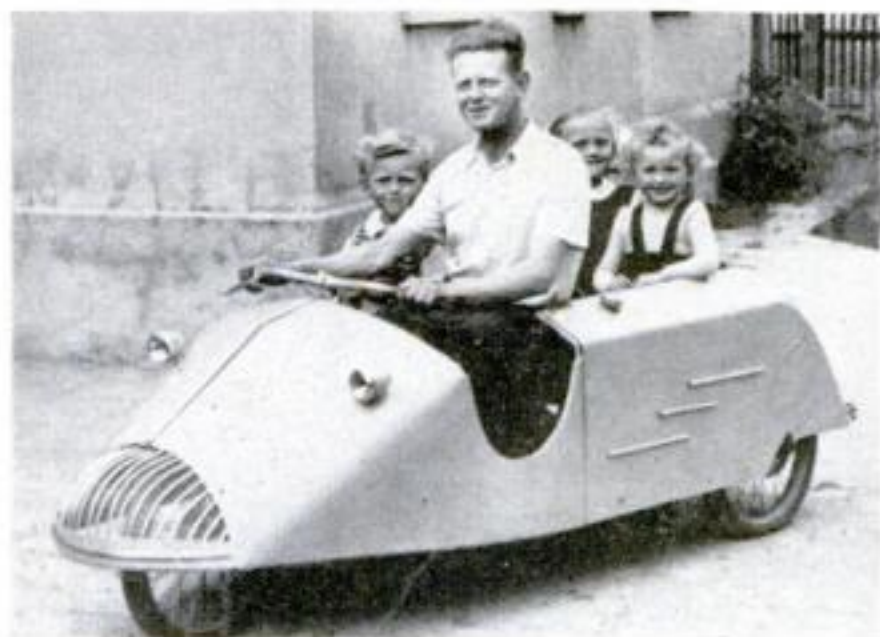
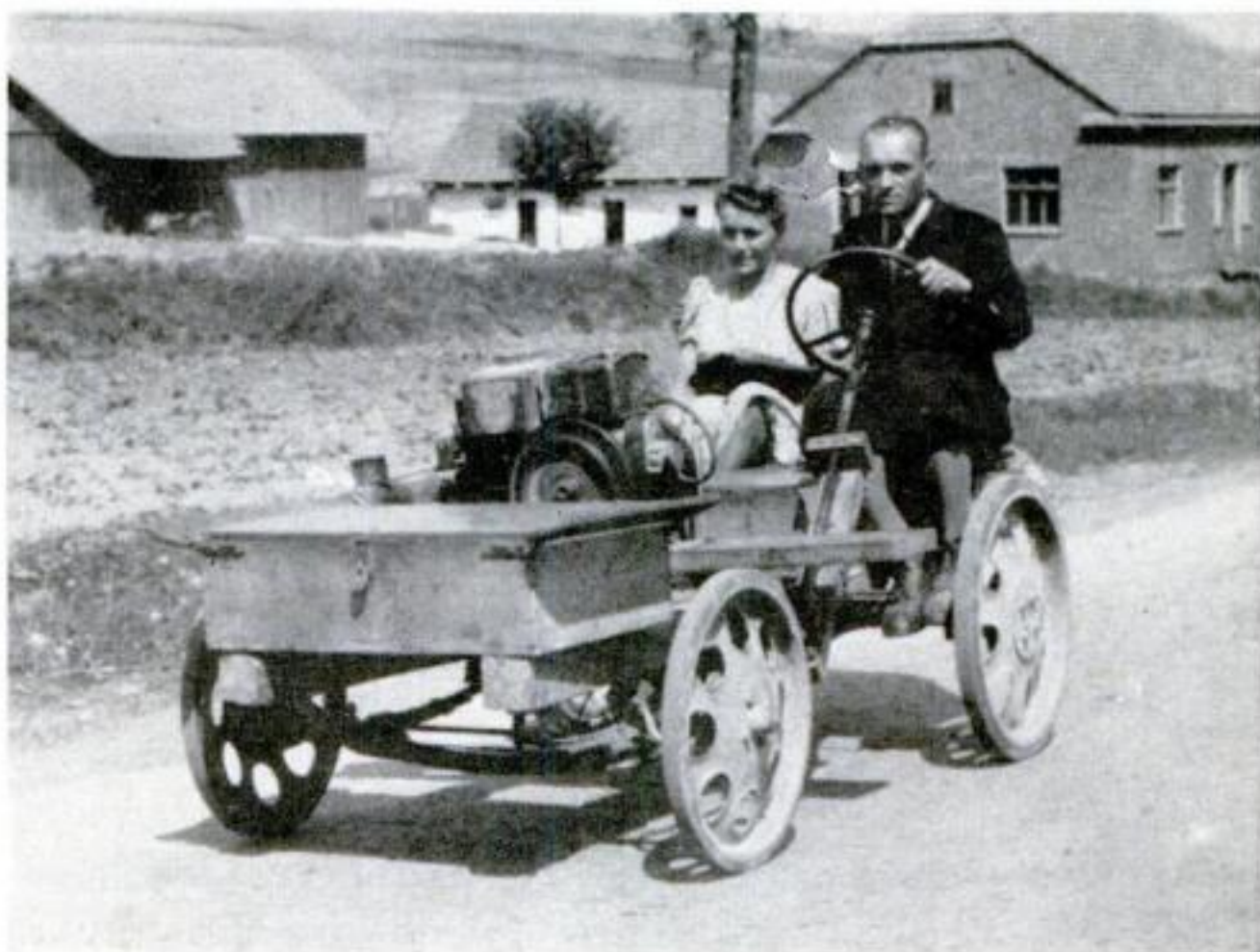




**Outfinning all Detroit,** this three-wheeler from Poznan has a massive tailplane that lifts the nose wheel off the road at speeds above 40 m.p.h. The car then scoots on

its two drive wheels, steered only by the dual rudders. An old 103-hp. Mercury V-8 powers the 23-foot, 1,600-lb. aerocar. Top speed is said to be 100 m.p.h.

**Better than walking,** this contraption built by a Polish farmer has a wooden frame, springs and axles from an old Austin, and steel cart wheels with solid-rubber tires. A one-lung engine from a cement mixer rolls it 58 miles on a gallon. Power is delivered to the rear wheels through two gearboxes linked to a belt drive.



**Expertly cobbled** from junked parts, this trim three-wheeler carries its builder and his brood of three at 18 m.p.h. He used the wheels and front fork of a motorcycle, bicycle handlebars, and a tiny six-cubic-inch engine from an old scooter.

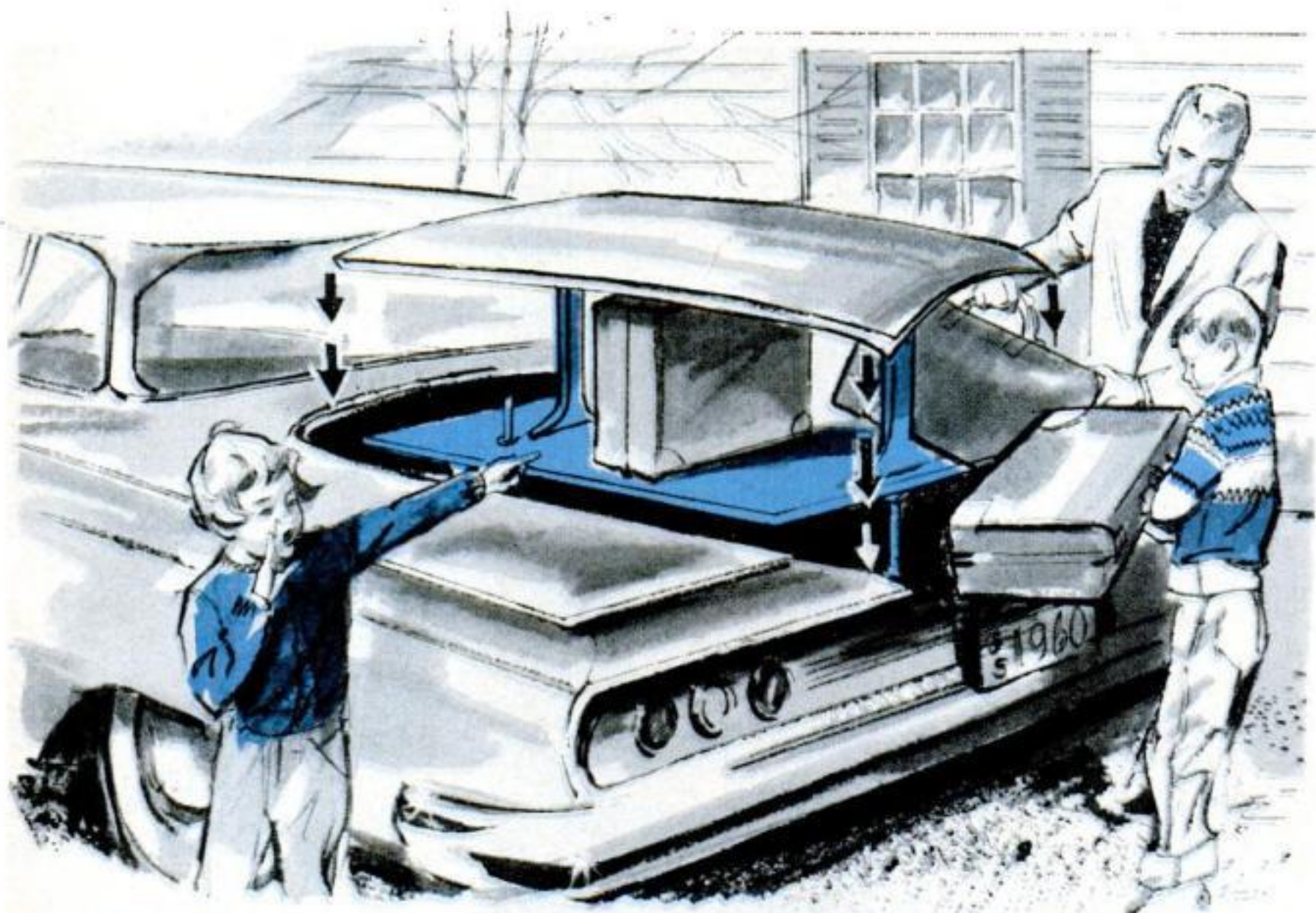


**Got a horse but no engine?** A taxi driver in Nowe Miasto ripped the defunct V-8 out of this 1936 Ford, built a seat on the engine compartment, and hitched on an oat burner, which is easier to come by in Poland than engine parts.



# New Ideas from the Inventors

.....

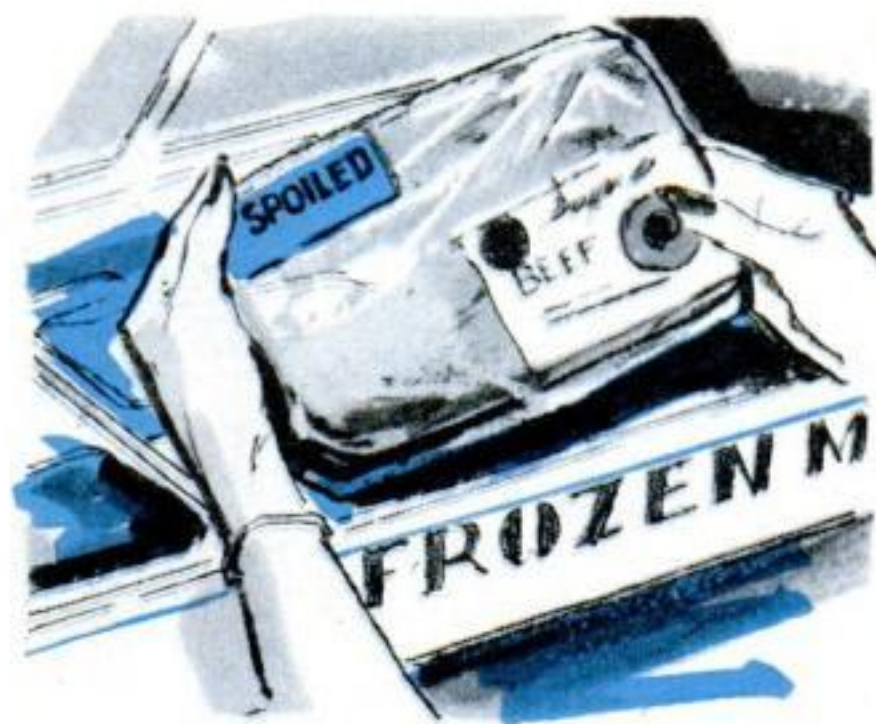


**Trunk Deck Raises Luggage.** Instead of lifting heavy grips or cartons out of this trunk, recently patented by GM, you'd just slide them off the fender-level plat-

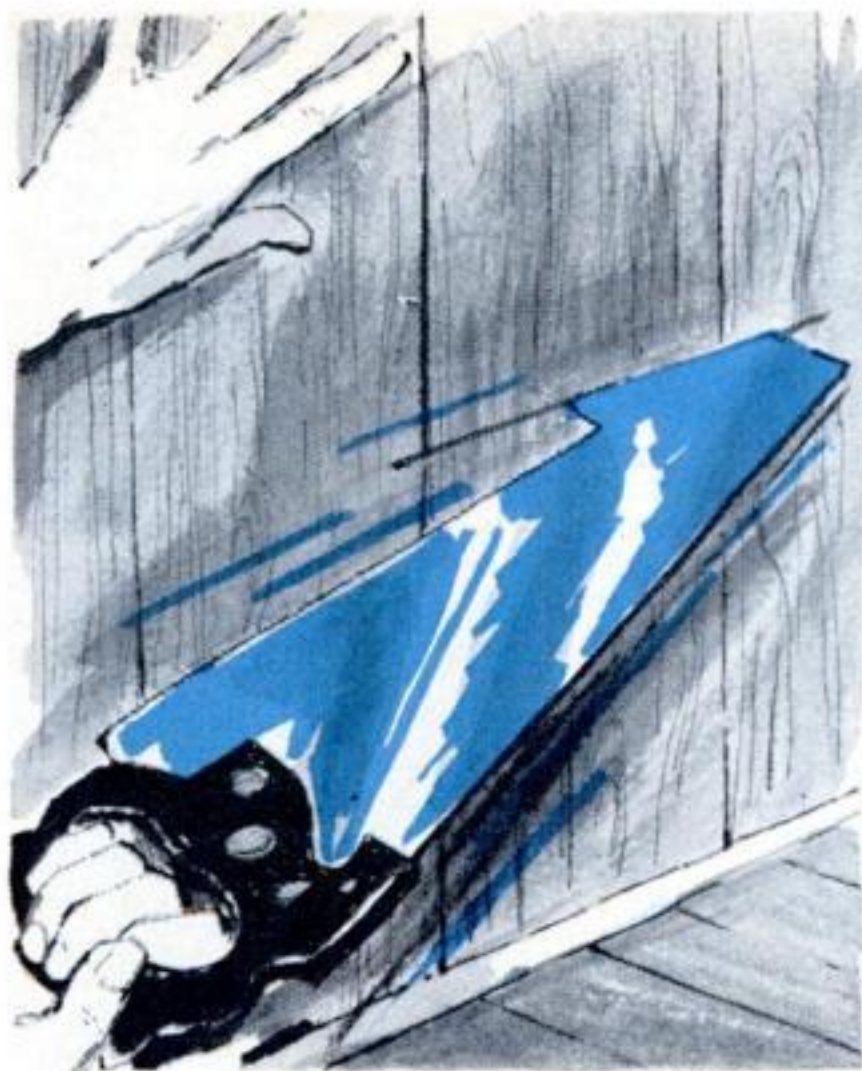
form. Platform and deck lid, built as a unit, would be power-lifted as shown. The trunk's space would be as accessible from the sides as from the rear.

**Fluid Joint Improves Rifle's Aim.** By damping barrel vibration that results from shooting, an oil-filled cylinder between barrel and stock of this rifle might keep the rifle accurate for a longer time. Vibration, says the inventor, loosens conventional wood-to-metal mountings.

**Telltale Label Guards Food.** This frozen-food protector would let you know if the contents of a package had been accidentally thawed and refrozen. Any temperature rise great enough to spoil the food would also melt a wax coating and reveal a printed warning beneath.







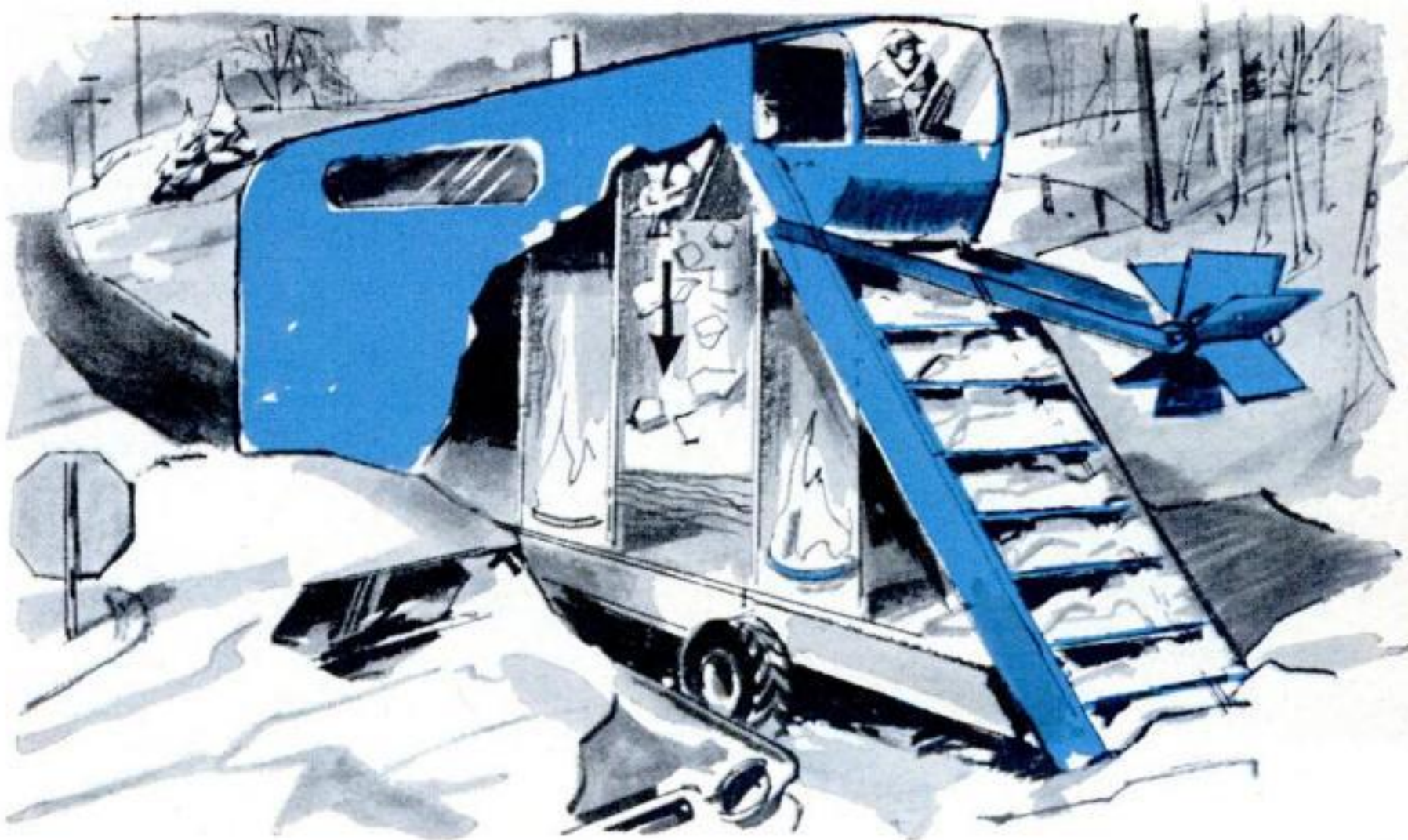
**Stepped Saw Starts Blind Cut.** You wouldn't have to drill a panel to start an inside cut if your saw had this toothed offset. Stiffened by the larger blade, it would cut straighter than a keyhole saw. And—once the cut was started—the offset could act as a stop for the regular saw.



**Cap Monitors Brake Fluid.** Designed to replace the regular filler cap of a master brake cylinder, this signal device would warn you if hydraulic fluid fell below a safe level. A float in the cap would operate a switch that could be wired to a buzzer, light, or other alarm.

**Heated Tanks Melt Plowed Snow.** Snow can be compacted to about a tenth of its original volume by melting it down. This inventor would scoop it into heated tanks.

Collected water would either be discharged into sewers or sprinkled over plowed banks to speed freezing, keep drifts from blowing back onto the road.





## More Inventors' Ideas



**Wiper Clip-on Widens Arc.** Extending at an angle from the regular wiper, this attachment would sweep an irregular arc. It would reach the common blind spot at the upper center of a windshield, then bend (on the return stroke) to accommodate to the tighter spaces at the sides.

**Lighted Post Ends Disc Fumbles.** With this illuminated spindle, loading discs on a turntable or automatic record changer would be quicker and easier. Made of plastic, the post would enclose a small bulb that would double as a pilot light. Eliminating fumbles would also protect the record centers against chipping.



**Gutter Hides Behind Shingle.** Conventional gutters, says this inventor, are noted for their "lack of ornamental qualities." To remedy that, he'd form the trough into a narrow wedge conforming to roof lines. A wooden face crimped to the metal could be painted or shingled.

*The following patents have been issued on these inventions:*  
**Trunk lift**—No. 2,890,908 to R. McLean, Oak Park, and G. Podolan, St. Clair Shores, Mich.; **Rifle**—No. 2,894,347 to F. Woodcock, Gloucester, England; **Label**—No. 2,782,749 to J. Beckett, Glendale, and W. Marenus, Burbank, Cal.; **Saw**—No. 2,780,256 to J. Dodd, Temple City, Cal.; **Brake signal**—No. 2,786,110 to A. Bittle, Richmond, Cal.; **Snow melter**—No. 2,738,786 to E. Leary, San Francisco; **Wiper clip-on**—No. 2,787,018 to S. Smith, Chicago; **Lighted post**—No. 2,788,437 to E. Howle, Charleston, S.C.; **Gutter**—No. 2,780,184 to F. Olsson, Floral Park, N.Y.

Copies of patents may be ordered, by number, from the Commissioner of Patents, Washington 25, D.C., at 25 cents each. To write to an inventor, if the address given above is insufficient, you may address him (by name and patent number) in care of the Commissioner of Patents.

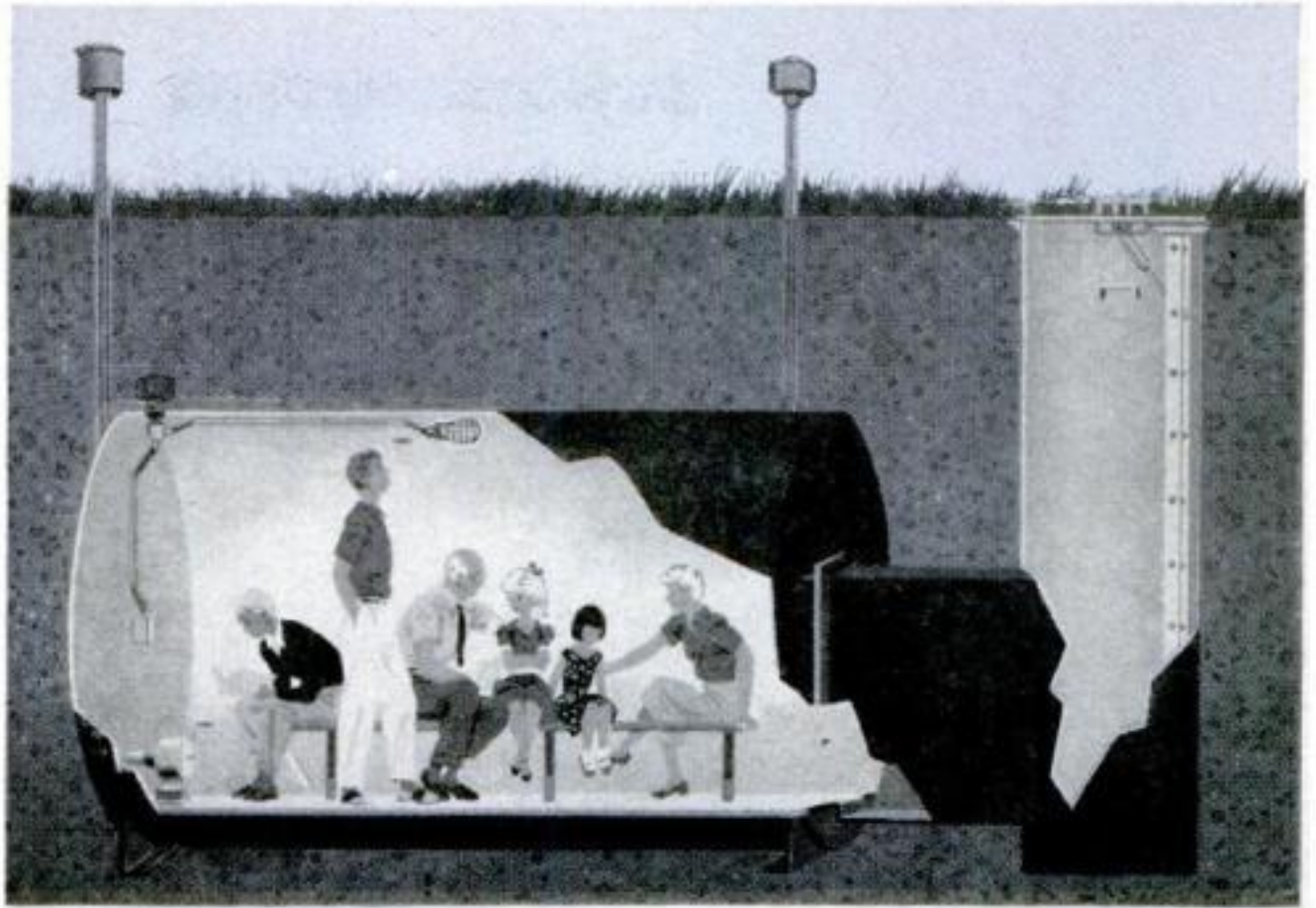


## SHELTER PROTECTS AGAINST FALLOUT

A nuclear-bomb shelter that will accommodate a family of six comfortably is being made for civilian use.

It's a steel tank buried three feet under the ground. Entrance and exit are through a submarine-type airlock and a ladder in a vertical tunnel. The near photo at right shows a boy passing through the crossover to the entrance with the tube on its side before installation.

Above ground are a filtered air intake and an exhaust duct. The shelter is made by Koven Fabricators, Inc., of Dover, N. J.



Family survival shelter has living quarters of normal room height.



Entrance is equipped with ladder. Hammocks supplement two bunks.



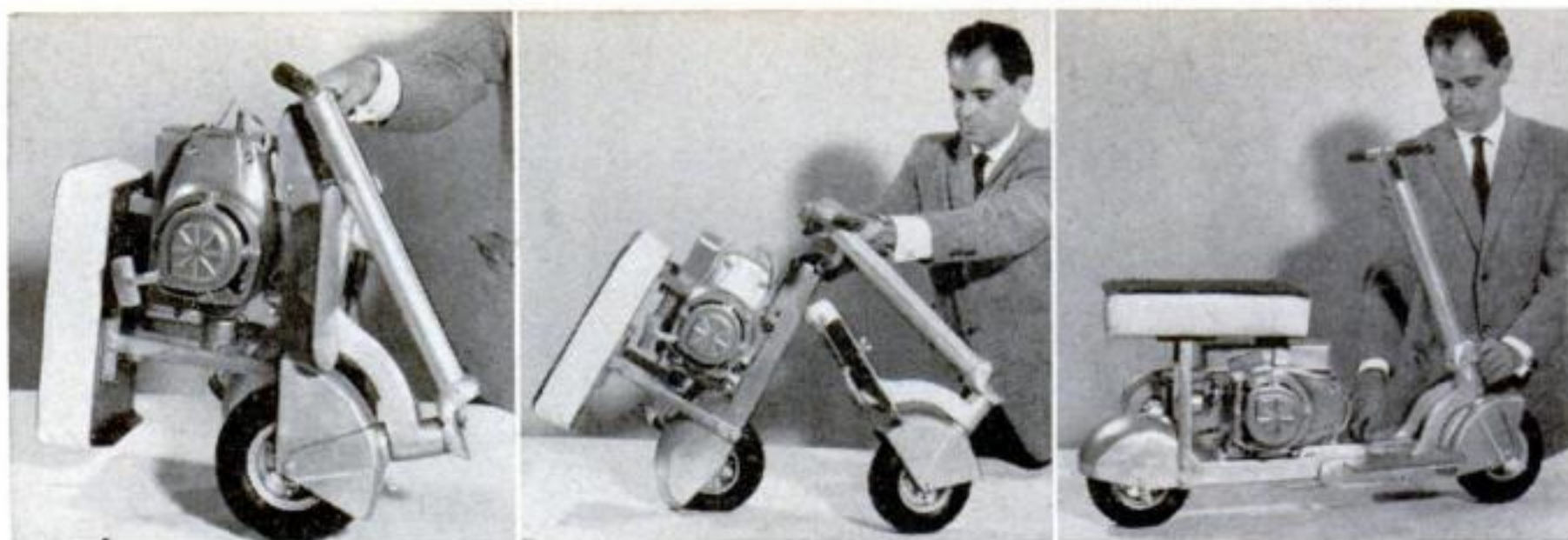
**FOR FISH-EYE VIEW.** When the drums on this device are filled, it submerges so University of Wisconsin students can study the feeding and spawning habits of bass. It's mounted on an 18-foot barge, propelled by outboard motor.

## What's He Carrying?



Turn the page to see ►





**HINGED IN TWO PLACES**, the scooter is flipped open by pulling out the steering post and pushing down on the middle part of the frame. Two

wingnuts (one at each hinge point) are tightened to lock the scooter in riding form. It takes about 15 seconds to make the conversion.

## 40-M.P.H. Scooter Folds into a 51-Pound Package

**T**HE JoyRide scooter can be carried or stowed in a car trunk, boat, plane, checkroom, or closet. Aluminum castings for the combination frame and body hold its weight down to 51 pounds. And most of the weight is in the two-cycle  $2\frac{1}{4}$ -hp. Power Products engine.

The four-ply pneumatic tires measure 2.50-by-4. A pull cord operates the recoil starter. Transmission, through a V belt

and pulleys, is automatic. The throttle can be rigged for foot or hand control; the single (rear) brake is pedal operated. One tiny tankful of gasoline—with oil mixed in—takes the scooter 40 miles. It goes 100 miles on a gallon.

JoyRide is available at some department stores or direct from I. R. Stevens and Co., 510 Madison Ave., NYC. List price is \$174.50.



**HITCHING A RIDE.** This idea for beating highway traffic on a holiday weekend was thought up and executed by the combined publicity departments of two big companies. You guessed it—one is Sikorsky Aircraft. The car? A 1960 Dart.



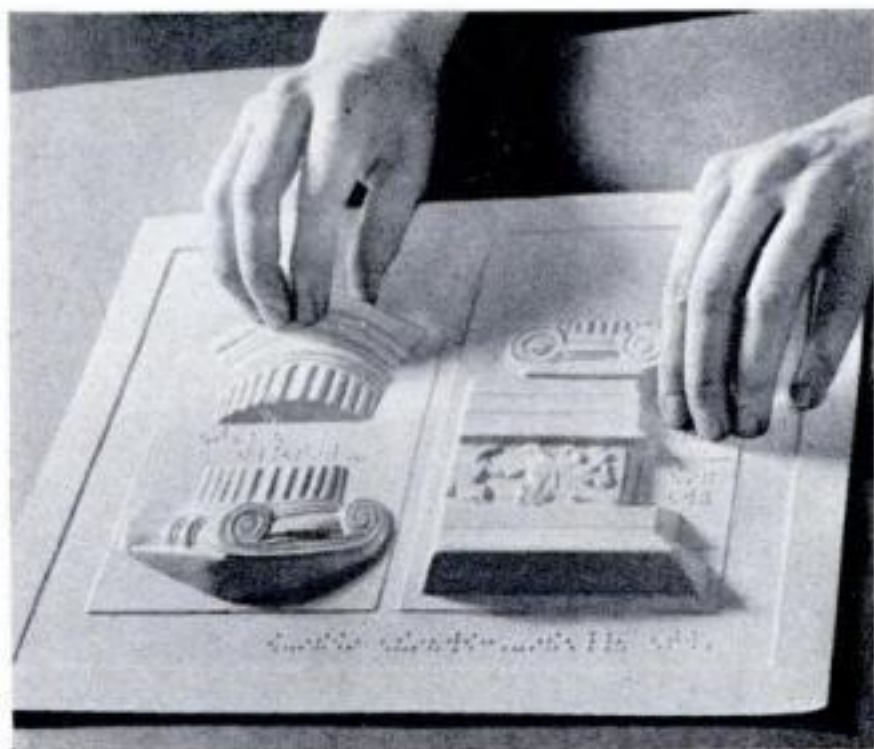
**EASY TO REACH.** The lazy Susan rack above was built by a GI at Fort Ord, Cal., to speed the issuance of 202 numbered gas masks. It was made from \$23 worth of plywood, salvaged parts from 57-mm. recoilless rifles, and jeep hubs.



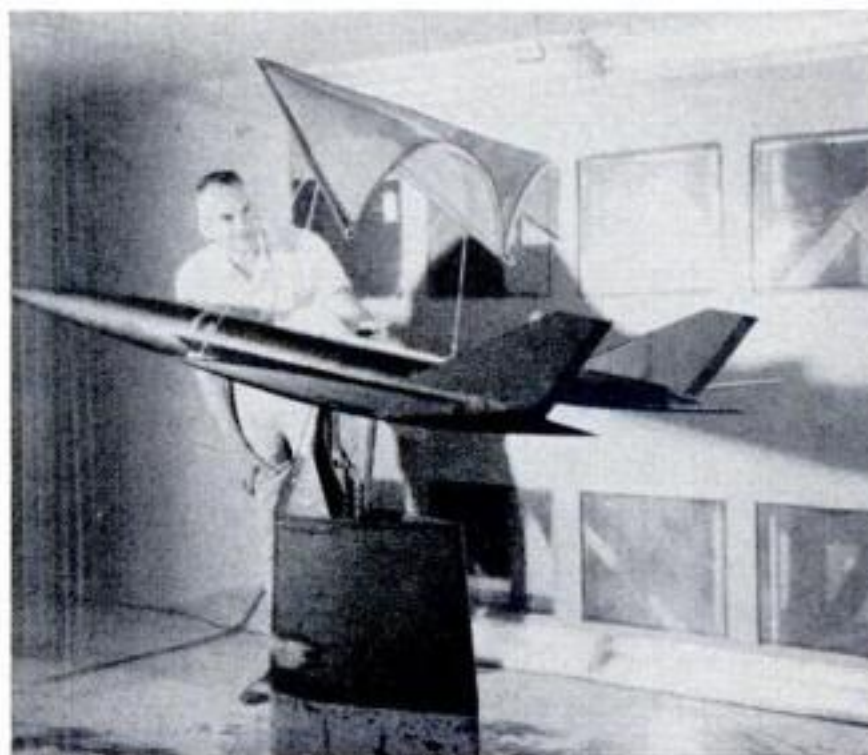


**ON THE ROAD,** folding scooter goes up to 40 m.p.h. and has a cruising range of 40 miles.

One pedal is the accelerator; the other works the rear brake. The seat is foam-rubber padded.



**ART IN BRAILLE.** The Ionic columns on this plaque bear an inscription in Braille, to teach the blind an appreciation of art and architecture. The plaque is one of a series prepared by the American Foundation for Overseas Blind.



**SPACE BRAKES.** Auxiliary wing is readied for wind-tunnel tests at Langley, Va., Research Center. Intended for future space vehicles, it would be housed in a top compartment, to act as a parachute on re-entering the atmosphere.



# Backstage at Winter Olympics

**\$20,000,000 Squaw Valley layout includes electronic computers, magic-eye timers, artificial ice, cannon to shoot down snowslides**

**By Guy Shipler Jr.**

**T**WO HUNDRED miles northeast of San Francisco lies a steep-sided valley heavy with snow. This month four Army cannon loaded with four-inch shells were unlimbered and pointed at the surrounding mountain slopes, ready to blast away when a critical moment arrives.

The place is Squaw Valley, Cal., site of the 1960 Winter Olympics. The big guns weren't brought in to keep the peace among the 1,200 highly competitive athletes from 31 nations. They are there to keep the athletes and 35,000 spectators from getting buried under avalanches.

This part of the Sierra Nevada Mountains gets the heaviest snowfall in the United States—more than 40 feet a year. And, generally, most of it falls in February, the month of the Winter Olympics.

Avalanches rate with floods, tornadoes, and hurricanes as among nature's most destructive forces. Hundreds of thousands of tons of snow may hurtle down at speeds up to 175 m.p.h.

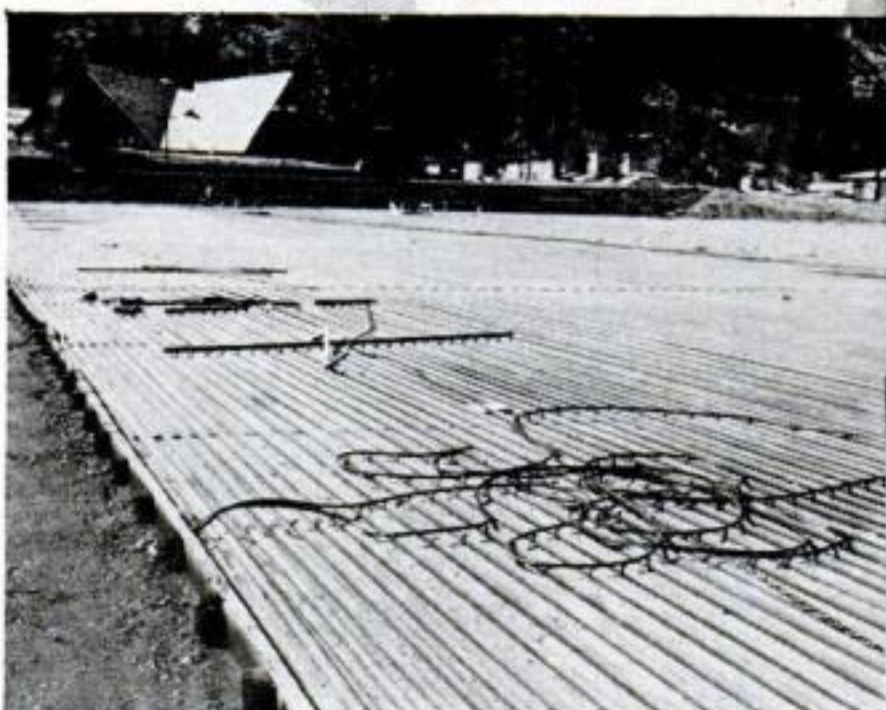
So far no one has figured a way to prevent them. But there are ways to make the avalanches slide ahead of time, before they have grown big enough or top-heavy enough to injure or kill. In Squaw Valley, Army artillerymen will blast them loose.

**Knowing when to shoot.** For the avalanche expert, there are three danger signs: rapidly falling snow that refuses to settle, and is dry and crystalline; temperatures dropping below 15 degrees; wind blowing faster than 25 m.p.h. When these signals appear simultaneously, zero hour has arrived for snow-nudging teams to go into action.

Though the avalanche-fighters depend on

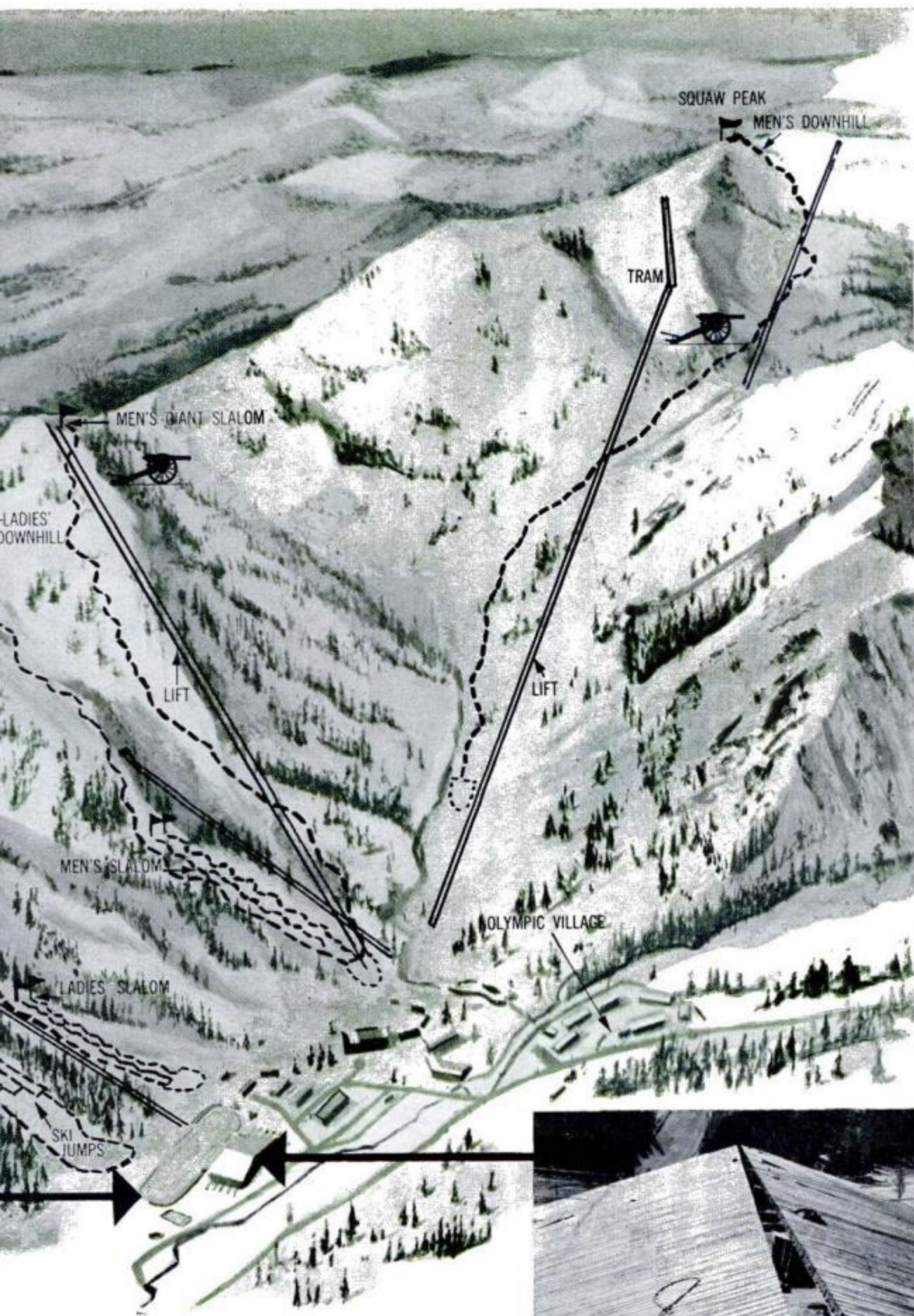


**BIG GUN** stands ready to break up potential avalanches on Squaw Peak, scene of men's downhill race.



**ARTIFICIAL SPEED TRACK**, first such ice rink ever used in Olympics, contains 70 miles of pipe. Linked to a 600-ton refrigeration plant, thermostatic controls will keep the surface smooth.





**ARENA ROOF** has an opening at the ridge. This permits the roof structure to move up and down as much as 22 inches, as snow load and temperature changes cause cables to expand and contract. Corrugations carry heat to melt snow.



CONTINUED



their experience to tell them when the danger hour has arrived, a pair of experts, Richard Stillman and Monty Atwater, have invented a forecasting machine that anybody can read. It consists of 15 disks, like poker chips, strung at two-inch intervals on three cords hanging from a steel, spring-type tape measure. Snow falls on the chips. If it settles, the weight pulls the tape spring, an easy-to-read signal that there is no immediate danger of an avalanche. If it's porous snow, containing too much air, it won't settle and the tape won't budge. That means danger.

**Taming a wilderness.** Previous Winter Games have been held at sites where facilities existed. Until it was chosen for the 1960 Games, Squaw Valley was known only to a handful of dedicated skiers. The builders had to start from scratch, tailoring everything from housing and dining halls to stadium and ice rinks. As a result, some startling new ideas were used in this \$20,000,000 layout.

From the valley floor, 6,200 feet above sea level, construction teams bulldozed twisting roads up the tough, 9,000-foot peaks to install chair lifts. While some slashed championship ski runs through thick pine forests, others molded a ski-jump hill out of the side of a mountain. Great diesel trucks chuffed in with tons of steel and concrete.

Skating races, for the first time in the history of the Games, will be held on artificial ice. A refrigeration plant, big enough to run the refrigerators in 4,800 homes, will keep ice at just the right degree of hardness on this rink and on four others for figure skating and hockey.

Refrigeration generates heat. This heat will be used to warm spectators, provide hot water for showers, and melt snow on the roof of a main arena seating 9,000 spectators.

The arena roof is a marvel in itself. It's designed to move up and down as much as 22 inches as snow load and

temperature cause its supporting cables to expand or contract.

**Timing and scoring.** The 1960 Winter Games will be the most accurately timed and scored sporting event ever held. Basis of the system is some \$200,000 worth of precision timing equipment developed by Longines. Heart of it is a Printing Timer, with a quartz clock as a time standard. The quartz clock is more accurate than celestial observations.

Slalom racers—they're the fellows who zing down mountains on a zigzag course—will be timed as they go through a "gate" at the start and again when they break a light beam at the finish.

Hockey games will be timed by electric clocks to within a tenth of a second. If a puck slamming into a cage is a fraction of a second behind the end of a period, a red light will signal NO GOAL.

Dead heats in races will be unlikely because of timing devices measuring accurately to hundredths of a second.

The whole timing installation is dual, to insure against failure. Moreover, all systems are interconnected: If an avalanche knocks

out the downhill timing system, timing impulses can be shunted across to the slalom system. The wiring runs the ridges to connect all the systems as needed. And against the long chance that all systems fail, there will be official timekeepers clocking all events manually.

Eliminated, too, will be the long delays while results are calculated. (Complex data on some events in past Olympics took as much as five hours to compute.) This year the data will be processed within two minutes by an IBM electronic computer, which will print the results simultaneously in English and French.

No attempt will be made to remove snow from the valley's 12,000-car parking area. Instead, Navy compaction machines will crunch it down in layers—a layer of snow, then a layer of sawdust. The surface will be as hard as rock.



**CONTROL POINT** under arena permits flexible and accurate thermostatic control of ice surfaces. The system uses calcium chloride brine and Freon-12.



# Mechanics and Handicraft SECTION

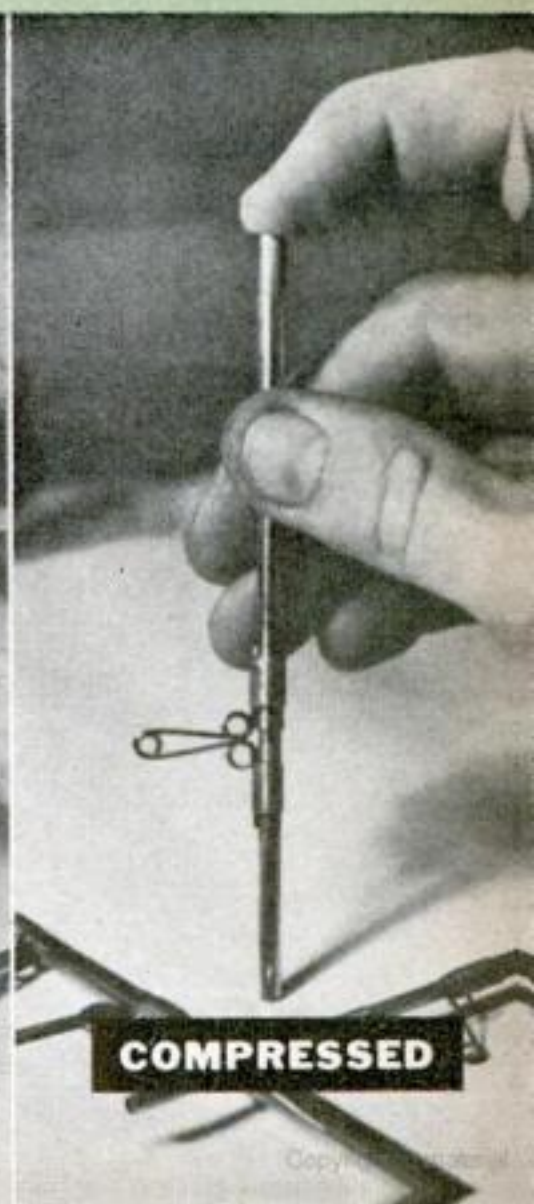
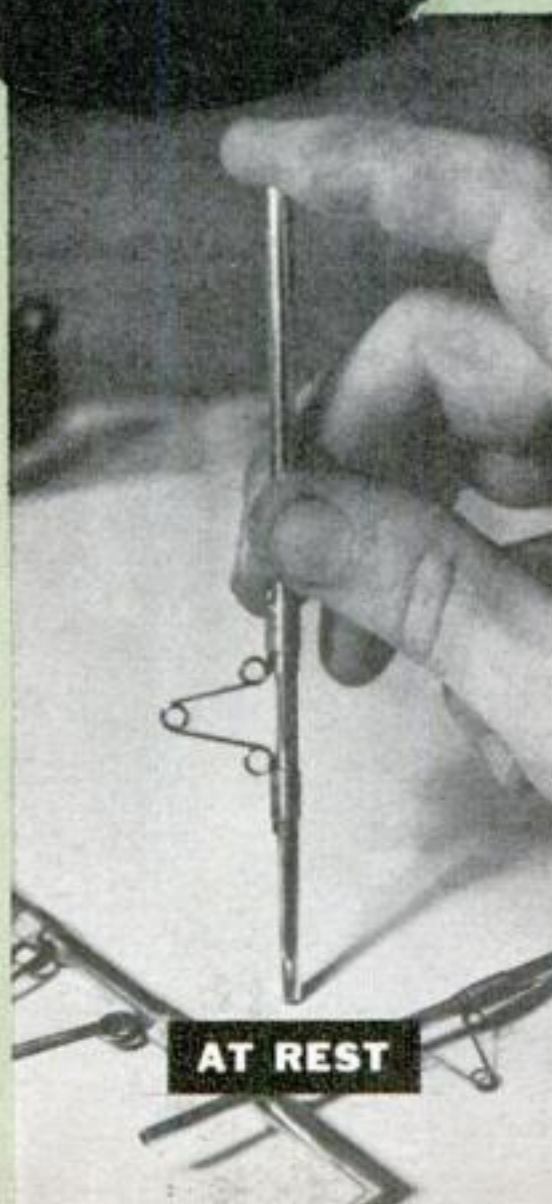
## Knee-Spring Struts for Control-Line Planes

By Joseph Whitehill

ONE of my friends who builds highly detailed control-line model planes calculates that he spends an hour and a half at the workbench for every airborne minute he achieves. Sweeping up the ruins of a plane he has spent two months building, he says sadly, "Well, that's the way it goes."

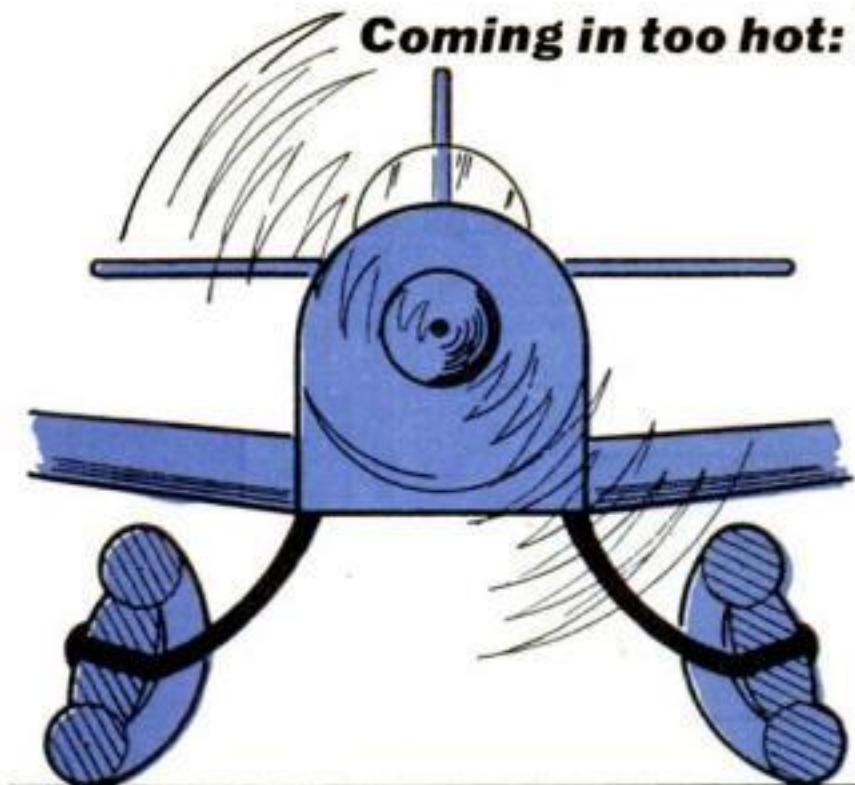
CONTINUED

*Here is crash insurance for the fine model on which you have spent so many hours of loving work*

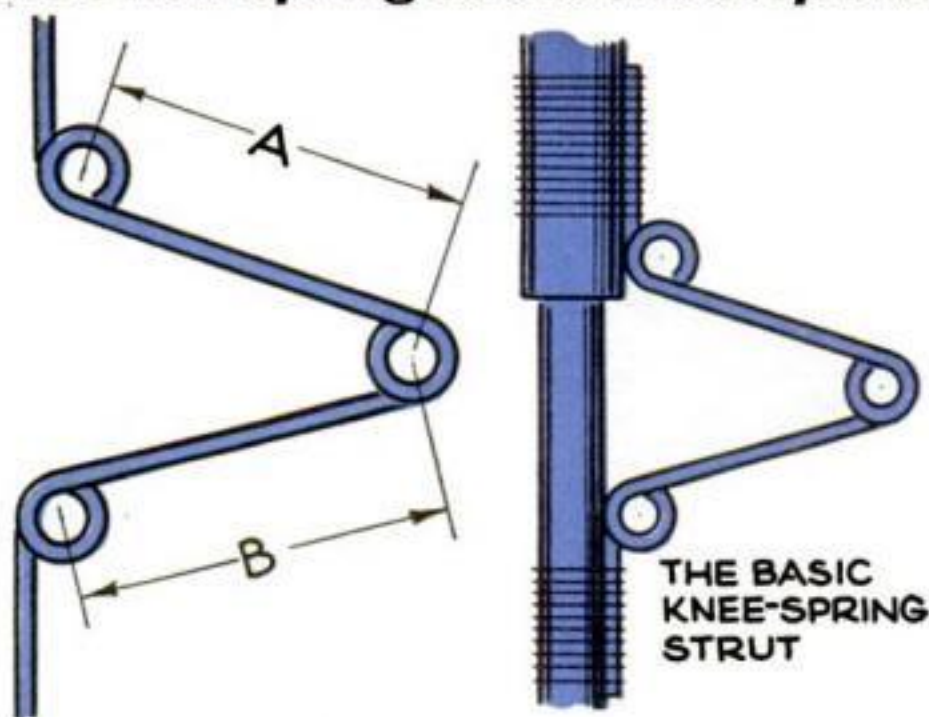




## Coming in too hot: Here's how spring struts can stop that



**WHY PLANES CRASH:** Conventional landing gear bends on impact, causing wheels to bind and trip plane into nosing over. Knee springs absorb shock and keep wheels rolling freely.



**BASIC KNEE SPRING** is simply a wire bent with three loops as shown. Lower leg "b" is slightly longer than upper leg "a" to account for smaller-diameter tube to which it is attached.

But does it have to go that way? No. First, note that there are relatively few *flying* failures. Nearly all accidents happen because of faulty landings.

A typical landing goes like this: The engine falters warningly a couple of times, telling you to lose altitude at once. You do this and fly level at waist height until the engine quits and that sickening slack comes in the lines. At this point you have a choice of either panicking or keeping your head.

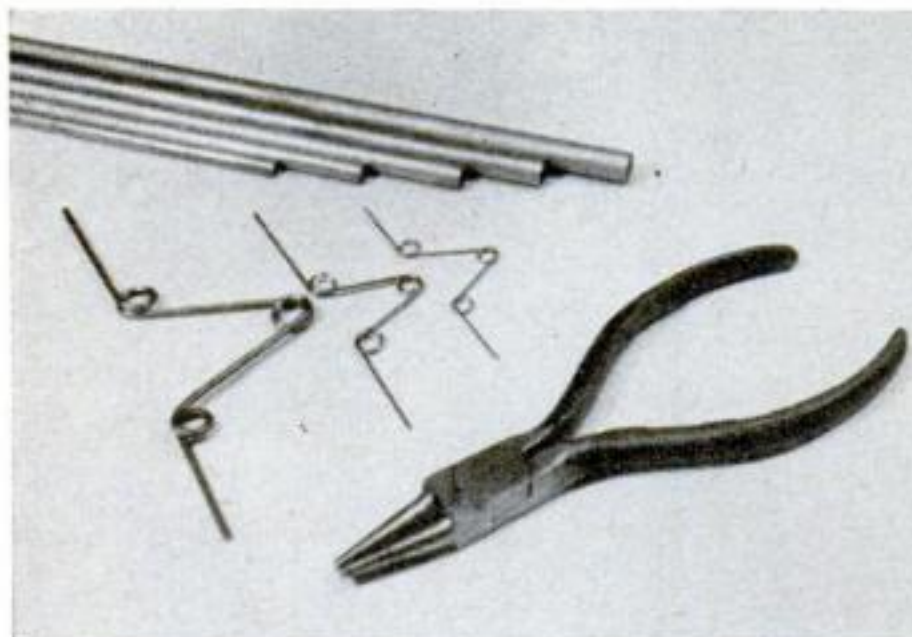
If you panic, you haul back on the stick too abruptly, the plane shoots up in the air, whipstalls, and comes down hard. If you keep your head, you will ease the stick forward to lose altitude at

a uniform rate, then level out about six inches off the ground and stall it in neatly, making a safe landing.

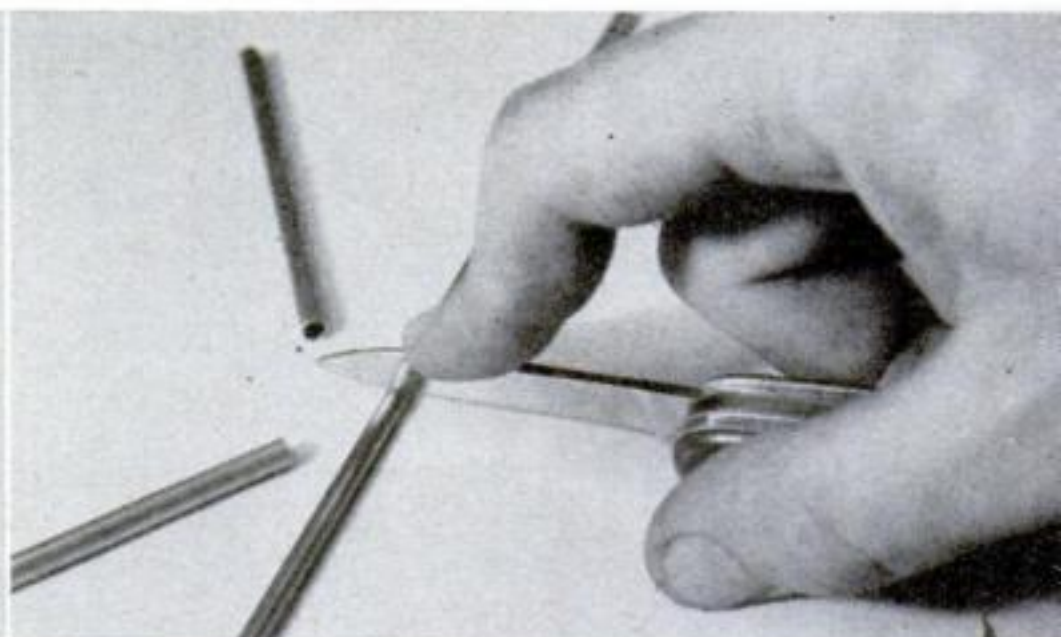
In between the panic stall, which no plane can survive, and the skimming, pretty setdown are many marginal landings where an improvement in the landing gear can spell the difference between safety and disaster. Your model comes in a little too hard, and what happens? The conventional plain wire wheel struts fail just when they are needed most. They bend outward and the wheels drag, slowing the plane so abruptly that it noses over on its back.

The answer lies in a simple knee-spring wheel strut that will compress as the

## Wire, tubing, and solder are all you need to assemble your own



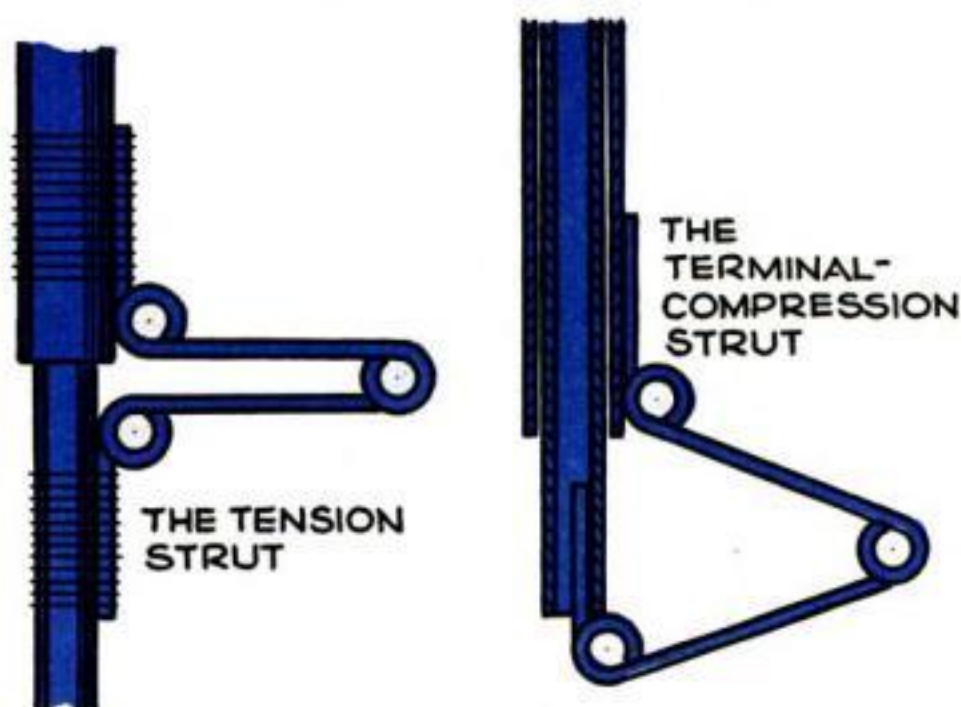
**ASSORTED SIZES OF WIRE** can be used to vary spring stiffness according to weight of model. Tiny brass tubing, available at hobby shops, is used for telescoping parts of the struts.



**BRASS TUBING** can be cut easily to length by rolling it slowly back and forth under a sharp knife, as above. Each size of tubing makes a good sliding fit in the next larger diameter.



## heartbreaking shower of balsa



**TENSION STRUT**, though not often needed, can be made with spring legs parallel (above, left) so they pull when stretched. "Terminal-compression" strut at right pushes tubes apart.

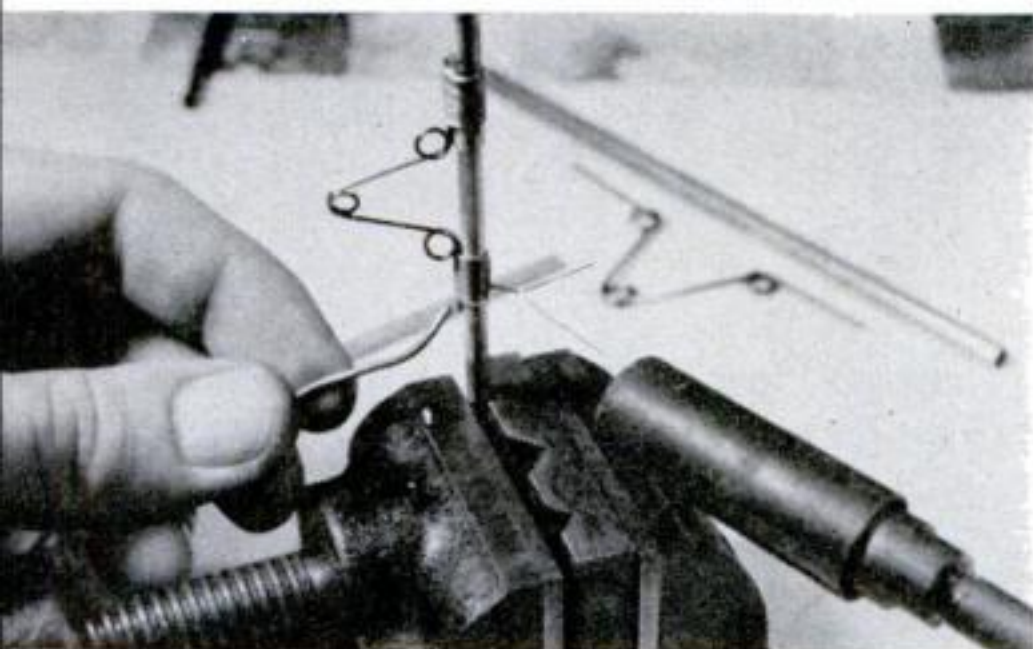
wheels strike the ground and absorb the shock without bending. This would keep the axles in line so that the wheels couldn't drag. With the wheels turning freely, a plane could hit the ground with a relatively hard smack and still roll on to a safe landing.

*All the materials required* to build knee-spring struts are available in most hobby shops—assorted telescoping sizes of hard-drawn brass tubing, music wire, radio solder, and small, soft-drawn copper wire.

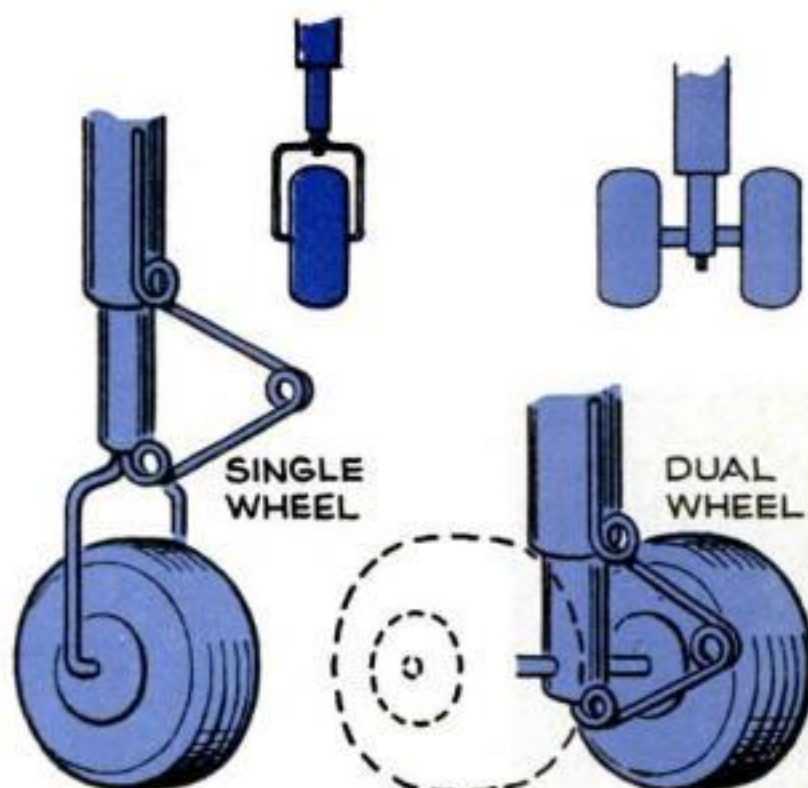
Just by hand-forming music wire in the jaws of a small pair of round-nose pliers, the basic knee spring can be given

[\[Continued on page 244\]](#)

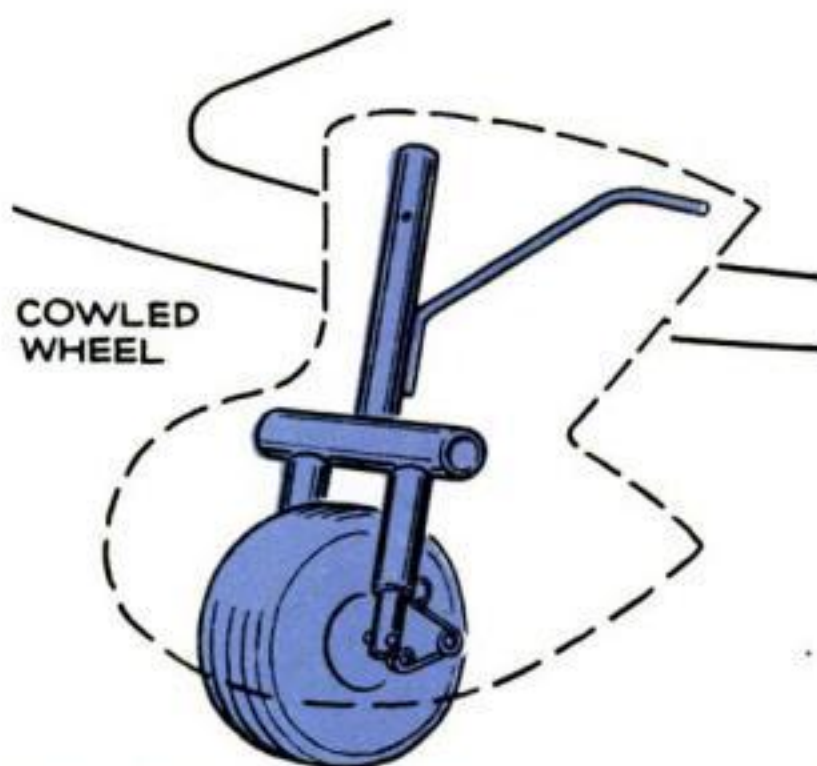
## knee-spring struts like this



**SOLDERING SPRING TO STRUT** is most important step for strength. Ends of spring are bound with wire, but only for temporary support. Be sure to get a solid, wet-flowing solder bond.



**MOST POPULAR STRUT** is terminal-compression type because, with spring at bottom, axle can be soldered directly to end. It easily permits either single- or dual-wheel units.



**WHERE SPACE IS CRAMPED**, as inside a cowled wheel like this, two tiny light-duty springs can be combined in a simple clevis arrangement avoiding use of an overlarge spring.



**REAL-LOOKING LANDING GEAR** not only saves crashes but improves appearance of fine models. Above are replacement spring struts for standard type found in primary trainer kits.



## Short Cuts and Tips

FROM PS READERS

### How to Shape a Heart Cake

TELL your wife she can make a St. Valentine's Day cake with a round pan and a square one if the diameter of the first equals the side dimension of the second. After a cake has been baked in each pan, the round cake is cut in half and the halves are then placed against adjoining sides of the square cake as in the inset sketch. —*Betty Rooker, Redondo Beach, Cal.*



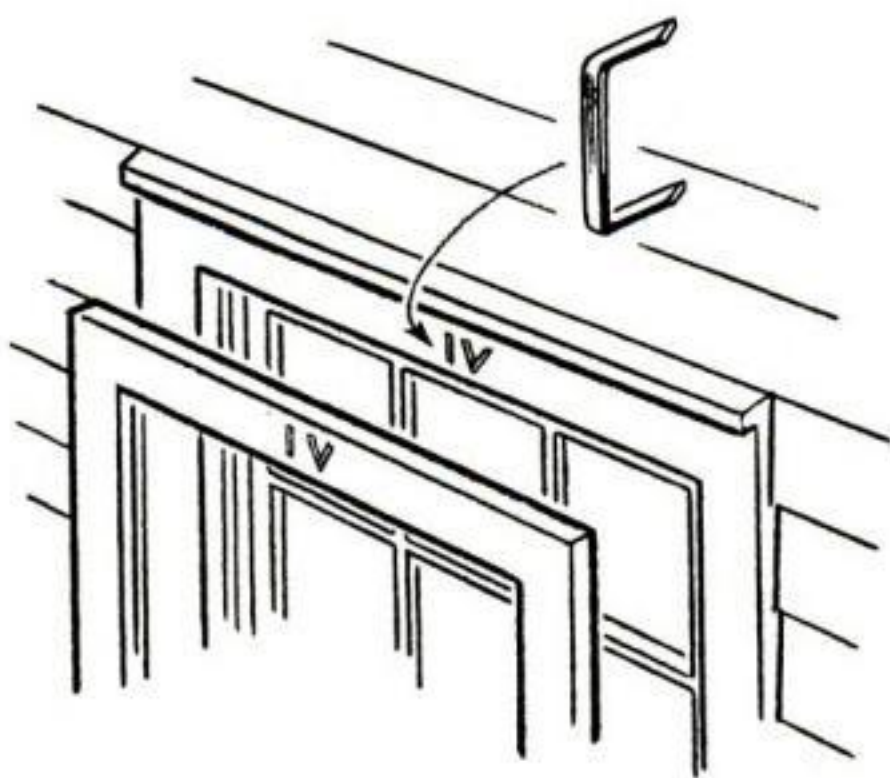
▶▶▶WHEN patching rough cement, go over the work with a wet brush just after the cement has started to set. This smooths out the patch and blends the edges into the surrounding cement surfaces.—*J. E. Cushman, Stonington, Conn.*

▶▶▶IF YOU'RE building a new house, have the masons install a chimney TV-antenna socket—a 3' or 4' piece of 2" pipe between the outside brick and the flue lining. The cement cap will hold it firmly in place.—*A. E. Bryant, Lynchburg, Va.*



### Helping Skunks Over the Top

DOWN in the Great Smoky Mountain National Park hungry small animals—including skunks—kept falling into garbage cans. They couldn't get out and smelled things up. Now they climb out on an escape ladder—a rough one-by-two attached by screws inside the waste container.—*Fred J. Overly, Gatlingburg, Tenn.*



### Numbers for Storm Windows

ROMAN numerals, formed with a stapling gun, are an inconspicuous way to identify the location of storm and screen windows. Place the staples at the top of each removable window sash, and in a corresponding position close by in the matching window casing.—*H. B. Jackson, Boise, Idaho.*



# How to Install a Stairwell Closet

THE waste space at the top of a stairwell is a perfect place to put that extra closet for seasonal storage. Most stairwells are up to 16' tall, leaving at least 6' that can be safely enclosed without stealing head room. Since you already have three sides and a ceiling, all you need is a floor and front.

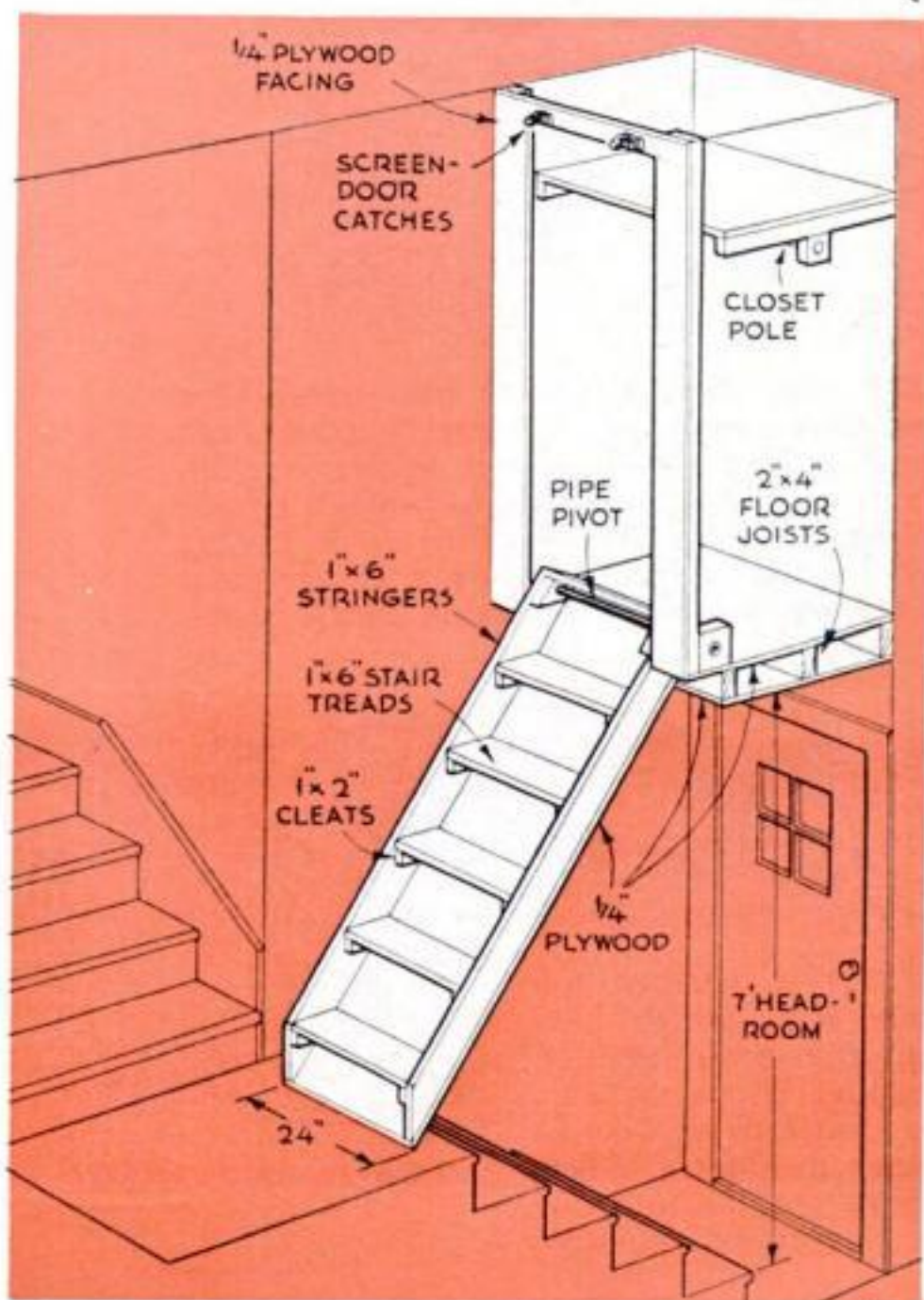
Into my closet I built a set of drop-down steps that also serves as the door. This makes it easy to reach stored articles without dragging out a ladder. When not in use, the steps swing up and are held closed by a pair of screen-door catches.

The kind of split-level stairway that has a landing part way down is ideal for such a closet, because it gives you easy access to the door. A similar arrangement can be worked out for a straight staircase, but it's harder to raise and lower the steps.

The step-door pivots on a length of  $\frac{1}{2}$ " pipe that passes through holes in the ends of the stringers. The ends of the pipe extend 2" at each side and fit into notches in wood blocks that serve as bearings.

Bear in mind, of course, that the exact location of the pivot point depends on the length of the steps and how far they swing down. I experimented by swinging a board up and down until I found how high the pipe had to be to keep the steps from binding. A window pole unlatches the steps, and raises and lowers them.—*Verner E. Pearson, Chicago.*

**HIDDEN STEP-DOOR** is automatically held closed by its own weight as it swings past pivot point at bottom. Swung open as at right, steps provide quick access to new storage closet built at the top of the stairwell.

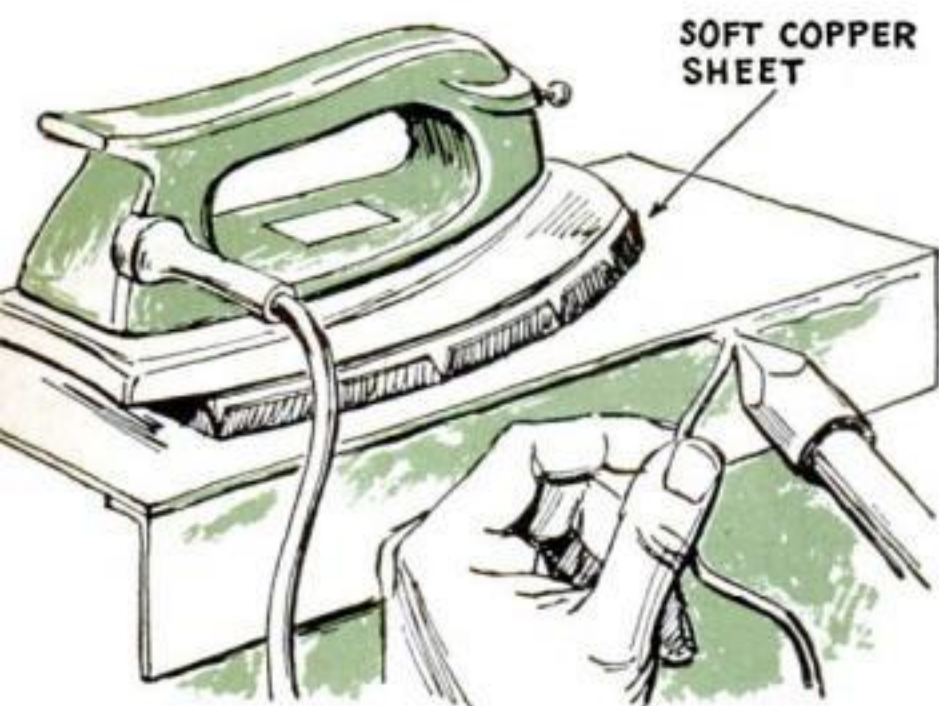




**YOUR IRON WILL HEAT FASTER** and stay hotter longer if you slip the tip into a length of pipe this way. The pipe holds the heat in.

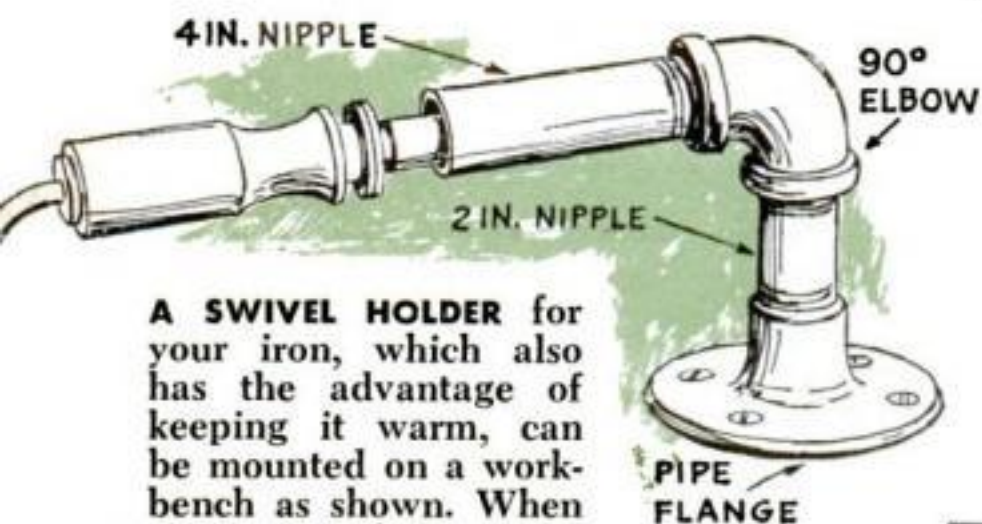


## Tips for a



SOFT COPPER SHEET

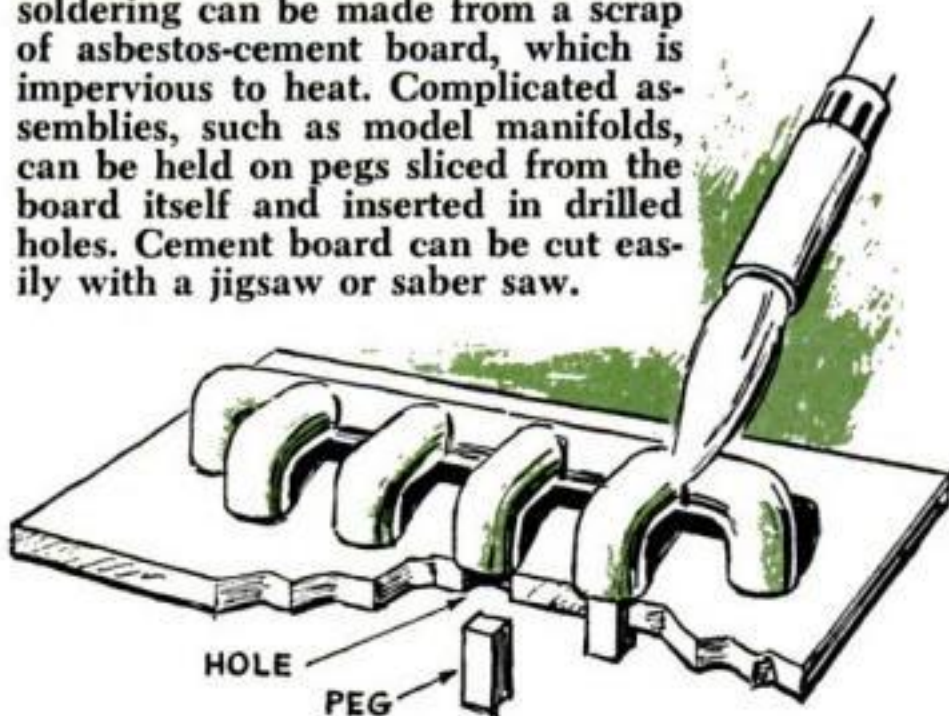
**EXTRA HEAT** from a pressing iron is useful for soldering large sheets of metal that lose heat quickly. Clip a shield of soft copper over the sole of the iron, as above, to protect it from solder and flux. Clamped face up in a vise, the household iron becomes a handy shop accessory for sweat-soldering small parts.



**A SWIVEL HOLDER** for your iron, which also has the advantage of keeping it warm, can be mounted on a workbench as shown. When not in use, the iron can be swung out of the way.

PIPE FLANGE

**A FIREPROOF JIG** for brazing or silver-soldering can be made from a scrap of asbestos-cement board, which is impervious to heat. Complicated assemblies, such as model manifolds, can be held on pegs sliced from the board itself and inserted in drilled holes. Cement board can be cut easily with a jigsaw or saber saw.



HOLE

PEG



**BRUSH KEEPER:** You'll never have to look for the brush if you solder the metal handle to the lid of a solder-paste can. When the lid is removed, it serves as a holder to keep the brush off the bench when you set it down between soldering jobs.

**ADJUSTABLE JIGS** to hold small parts at odd angles while you solder them can be improvised quickly. Use a pair of C clamps, laid flat on the bench (below right), or shape modeling clay to hold the parts, as illustrated at the left.

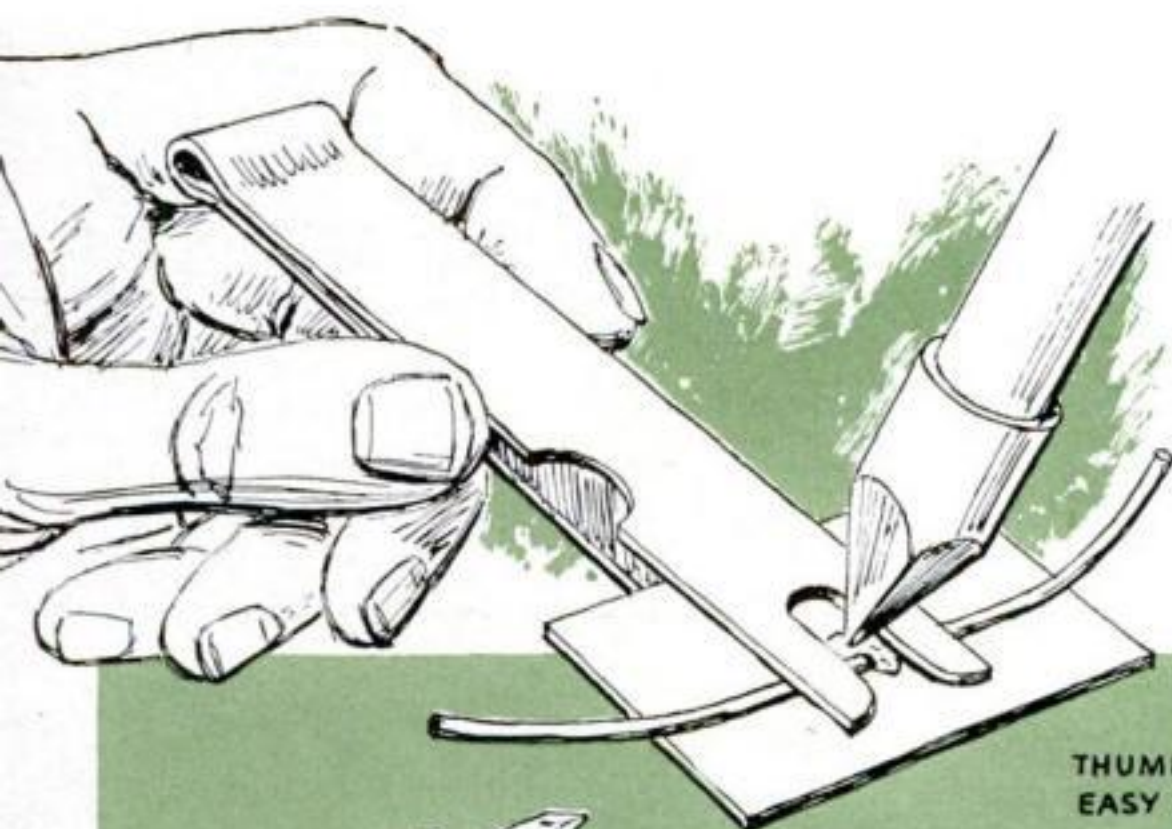




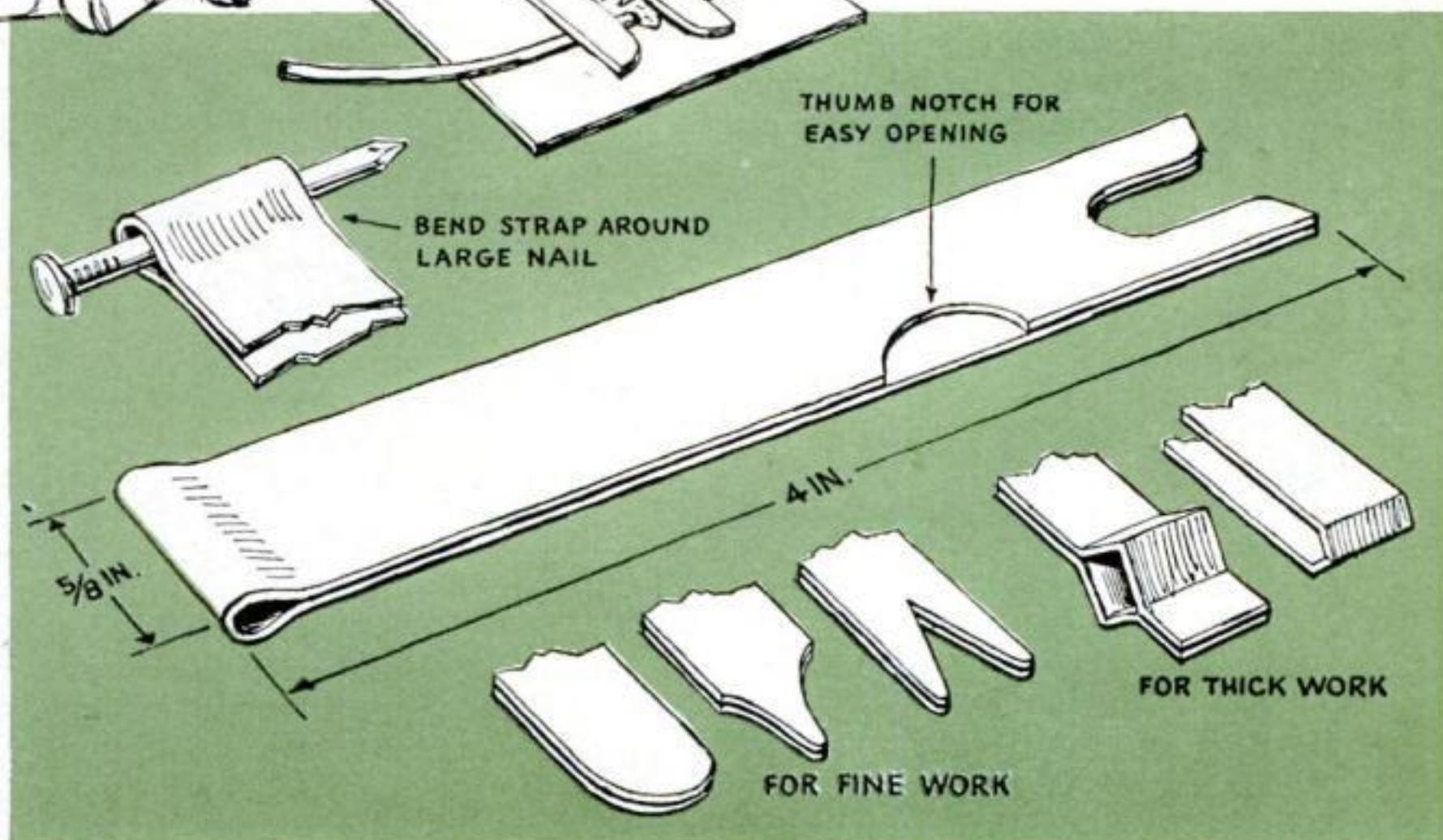


**SOLDER IS ALWAYS HANDY** if you keep it wrapped around the handle of your iron (upper sketch). Another trick is to wind a short length around the cord near the plug (lower sketch).

# Better Solder Job



**A ONE-HAND CLAMP** that you can easily make will hold tinned parts in perfect alignment while you use the iron with your free hand. It's shaped from stainless-steel TV-antenna strap, available from radio-supply stores. This won't hold solder. Bend a short length around a large nail to form a spring loop at one end. Then file a U-shaped slot at the tip. Other shapes can also be made, as shown in the drawings below, to hold different types of work.





## Short Cuts and Tips

FROM PS READERS

### Self-Unloader from a Spreader

WHEN Lief Garver of Boardman, Ohio, needed a self-unloader to speed farm crops into bin or silo, he removed the big beater from the rear of his manure spreader. The power take-off on the tractor drives a shaft that operates chain webbing on the wagon bed, pushing out corn or other materials onto the elevator.



▶▶▶NEXT time you have to replace a hard-to-reach fuse in a TV set or elsewhere, give the replacement fuse a handle made of cellophane tape. Place the new fuse in the center of a strip 2" long, fold the tape up over, and put the adhesive sides together face to face, forming a tab.  
—John A. Comstock, Wellsboro, Pa.

▶▶▶SHORT of galvanized screws to attach an aluminum threshold, I used a propane torch to coat the head of a steel screw with solder, after it was in place. This was two years ago, and though the galvanized screws have rusted out, the improvised one is as good as new.—Stephen N. Stresnic, Fort Lauderdale, Fla.

## WHAT'S YOUR MECHANICAL IQ?

### The Case of the Threading Cut

"I HAD just finished this threading cut on the lathe," said Jurgens, "when the lights went out. The crooks pulled the main switch to cut off the alarm."

Lieutenant Moore saw that the quick-change box was set to cut 11 threads per inch, a reasonable count for those on the bar between centers.

"Isn't the motor circuit separate from the lights?" he asked, idly turning the threading dial with a finger.

"Sure, but I switched off the lathe just as they went out," Jurgens replied quickly. "Then, stumbling around in the dark to get to the switchboard, I heard the crooks smash into the cashier's cage, and get away."

The Lieutenant straightened.

"No, you didn't. Working overtime alone, you waited for a night the payroll



was in the office safe. You made this bar much earlier, stuck it in the lathe, switched off the alarm and broke into the cage yourself. Then you called headquarters, trying to make it look like an outside job. The money is probably still here."

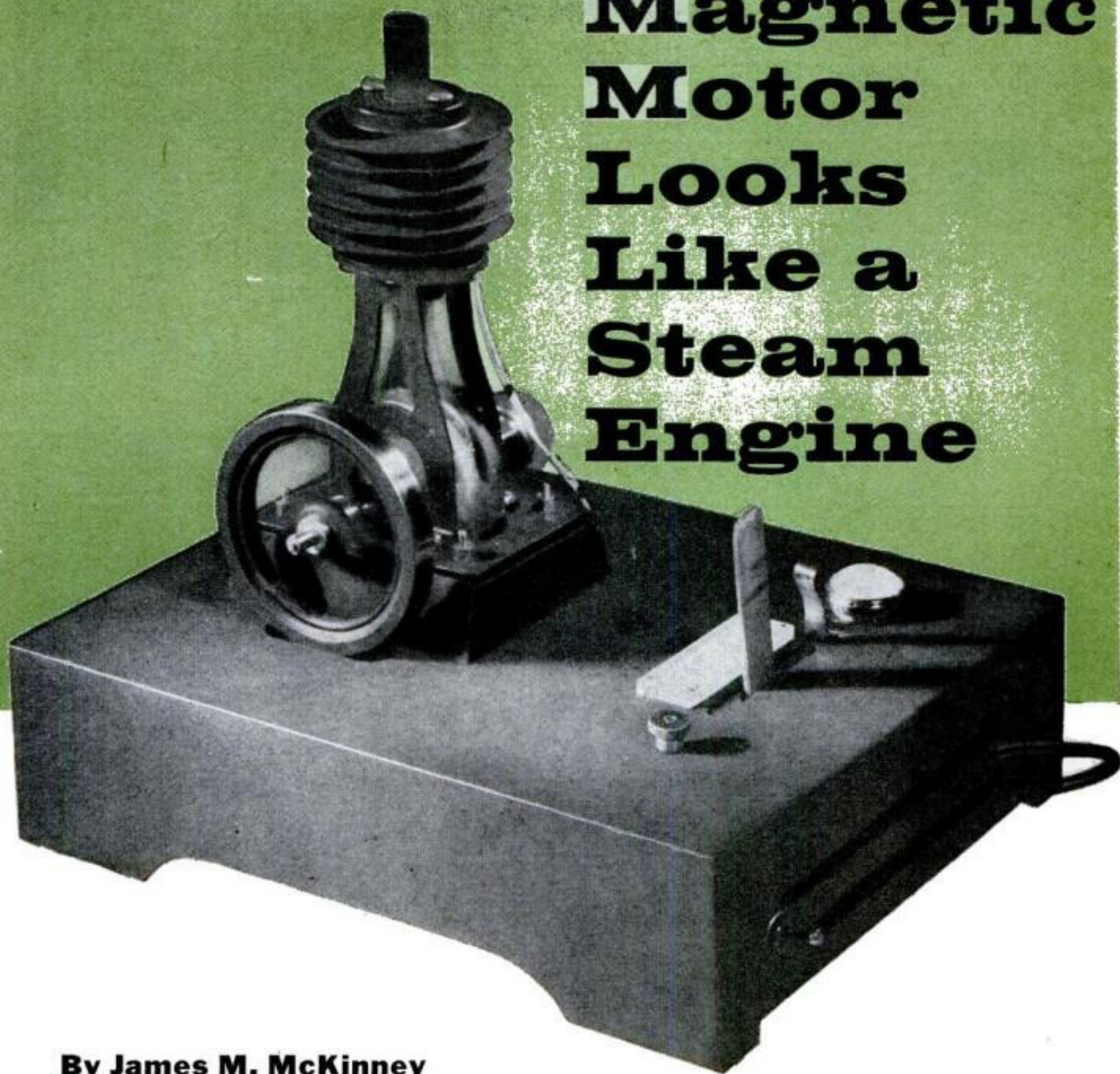
How did the Lieutenant know?

See page 152 for the answer.



**You'll find a happy combination of fine machining and electrical work in this challenging project**

# **Magnetic Motor Looks Like a Steam Engine**



**By James M. McKinney**

**I**F YOU like the flash, bob, and glitter of a model steam engine, this unusual project may be for you. The old-time steam flavor is what this engine produces—from magnetism.

The engine's cylinder is a solenoid, its piston a soft-iron core. The valves are breaker points, and the "steam" comes from pulses of household AC. The resulting twice-a-cycle magnetic field sets the engine spinning at 900 r.p.m.

This makes the engine a fine demonstration of electromagnetism. It's a sure-

fire conversation piece for classroom or parlor. Flick the switch and you can see how clever the guy who built it is.

Building it is a pleasant exercise on the lathe and drill press. It's not complex, but it does call for nice alignment and minimum friction.

**The base plate.** For rigidity and flatness, use  $\frac{3}{16}$ " steel or brass. Drill and file the crank clearance hole to shape. Then the plate can be used as a template for the wood engine mount. The tapped holes can be located later as other

CONTINUED

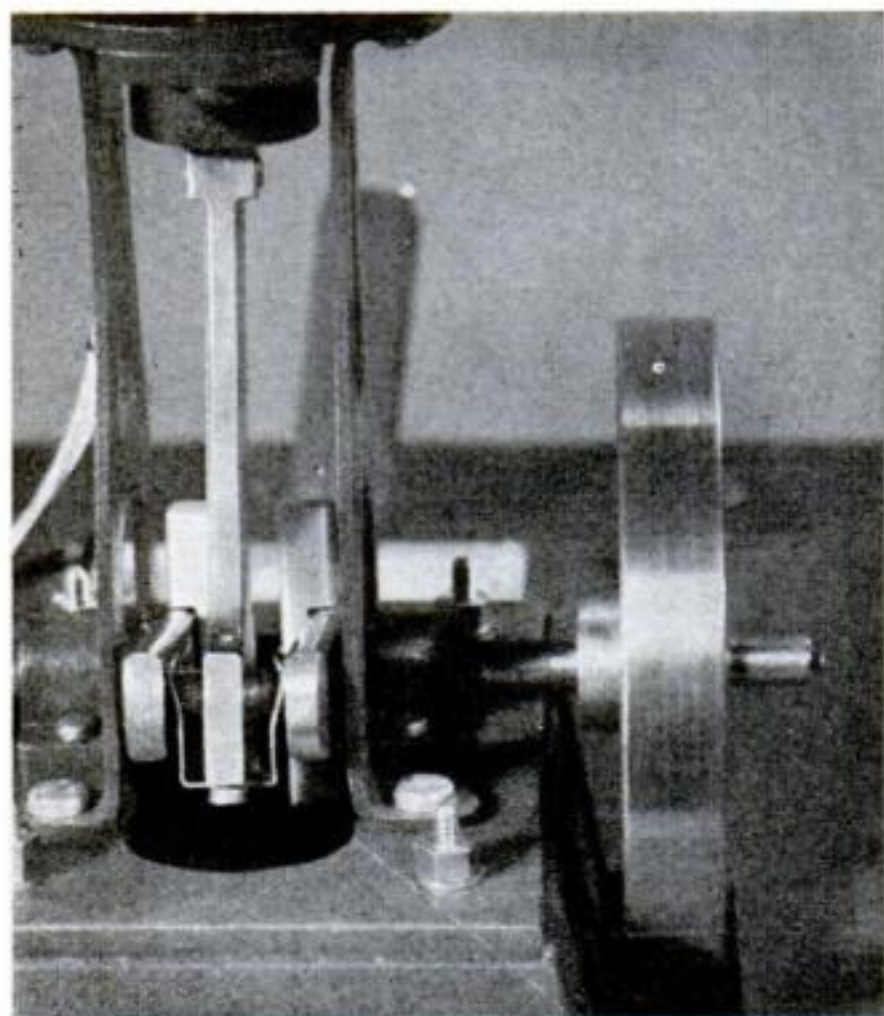
147



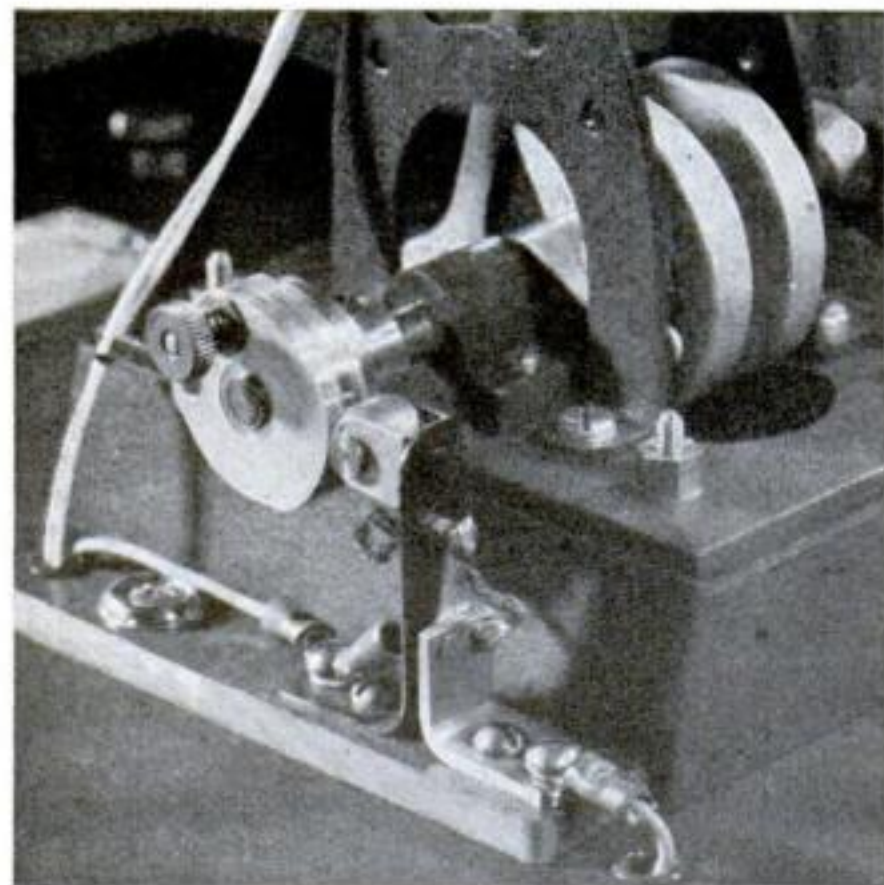
parts are completed and set in position.

Shape the bearings and bolt them in position on the plate before reaming the shaft holes. The 15/64" drill can be used as alignment pilot. Mark the bearings to help make sure they're always reassembled in the same position.

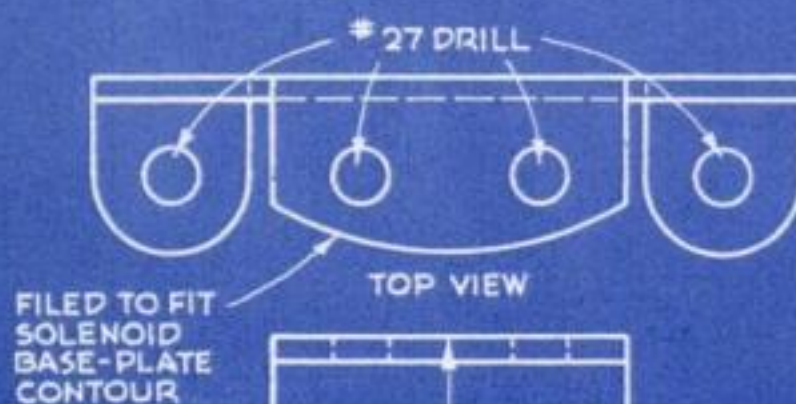
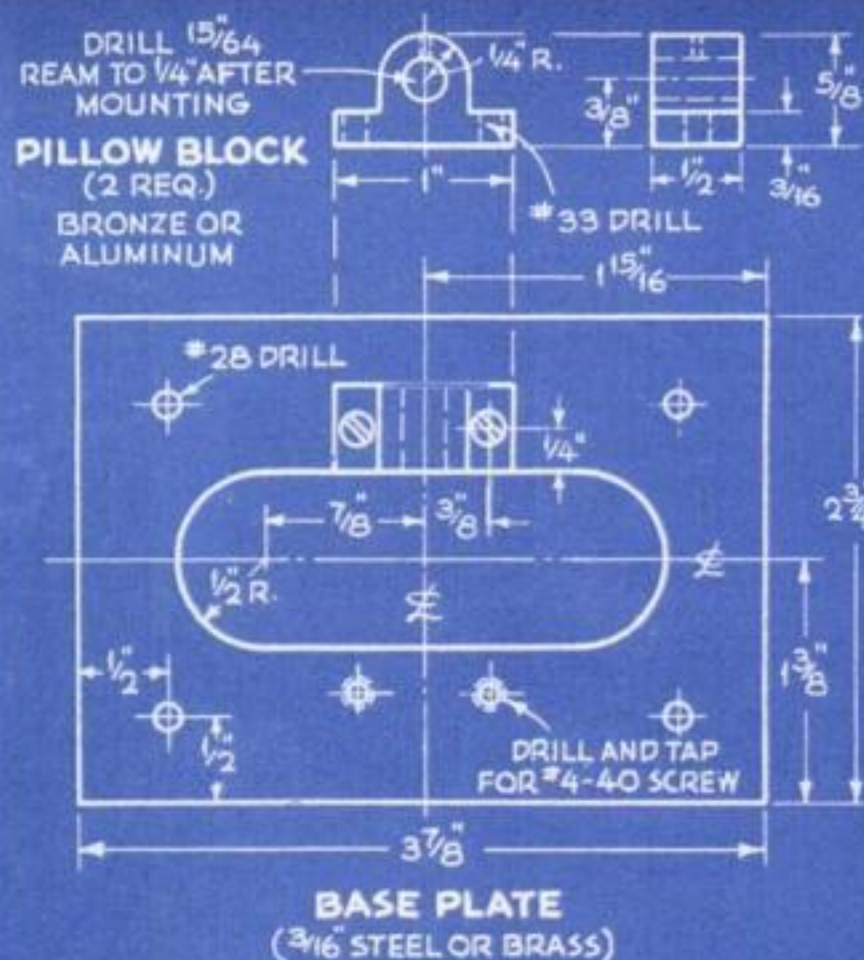
The *crankshaft webs* start as two pieces of steel bar. Or they could be



**CENTERING CLIP ON CONNECTING ROD** bears only lightly against the crank, could be eliminated by making the crank journal out of 5/16" shaft, recessing the center to 1/4" diameter.



**POINT ASSEMBLY IS ON SEPARATE BASE** for easy positioning. Cam lobe should push points shut, flex short spring for sliding contact. Elongated holes in bracket allow fine adjustment.



**SOLENOID FRAME (2 REQ)**  
(ACTUAL SIZE)

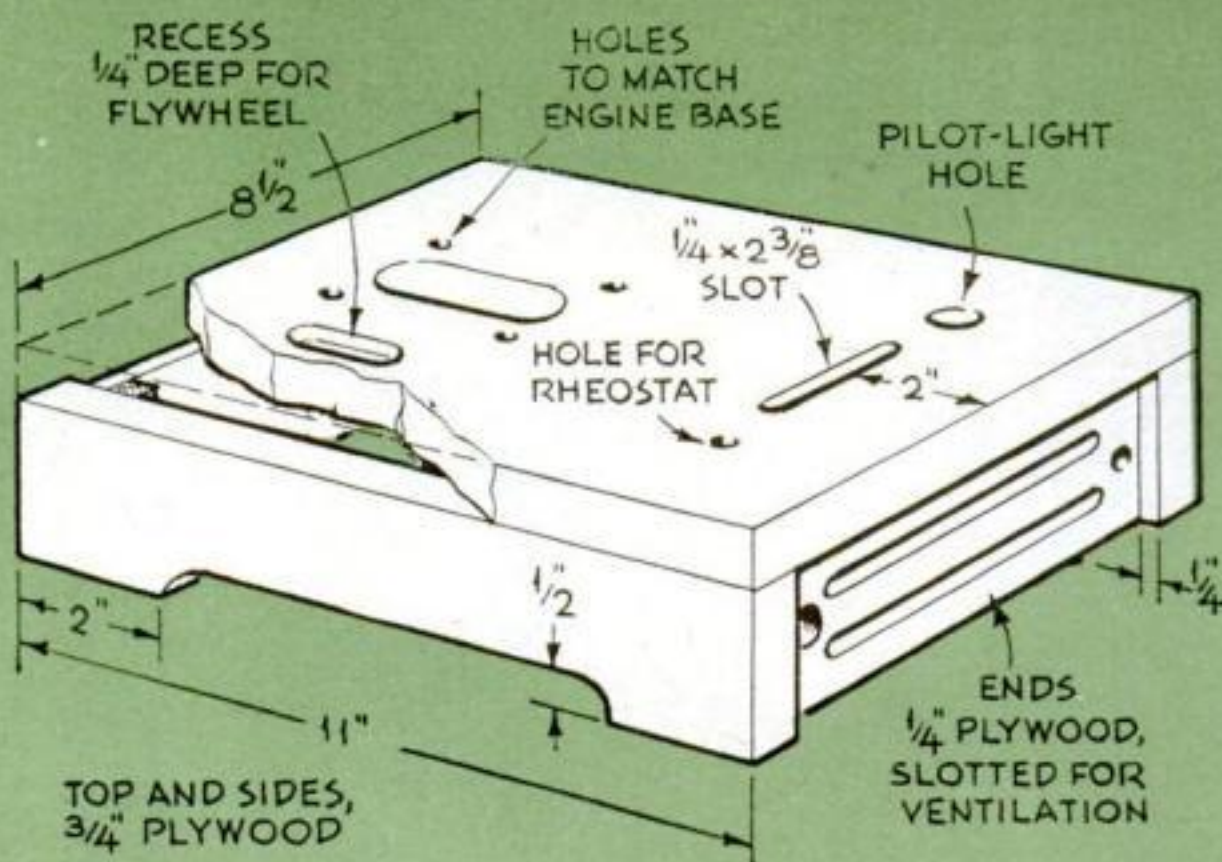






## "Boilerworks" are electric

**WIRING MAIN BASE** can be done easiest before engine is mounted; all parts except points and coil go on underside. Clearance holes for crank and flywheel can be located by positioning engine. Use #22 stranded hookup wire for electrical work; any low-wattage pilot can be used, other parts must be able to handle 50-75 watts. Capacitor from old electric motor can be used, and potentiometer can replace rheostat. Use flat black paint.



filed to shape from  $\frac{1}{4}$ " flat stock, which would eliminate adding counterweights.

Clamp the parts together before drilling and reaming. Press in the main shaft (made of cold-rolled steel or drill rod) and then the crank-throw journal. Solder the parts together before cutting out the main shaft's center. Then chuck the assembly; if it spins slowly without run-out, it's finished.

The connecting rod is  $\frac{3}{16}$ " flat aluminum. Drill and tap the end of the blank before cutting off the cap. Then smooth the cut and screw the cap back in place. When the  $\frac{1}{4}$ " shaft hole is drilled

and reamed, mark cap and rod for identical replacement.

Riveting  $\frac{1}{16}$ " flat stock to the upper end saves filing a piston slot. Drill the  $\frac{1}{8}$ " wristpin hole; this will be a press fit for the pin. If the spacing between wristpin and shaft holes checks out, file the rod to shape. Be sure to check the spacing first; it's heartbreaking to find you've filed a misdrilled rod.

The engine's "A" frames must have parallel and true 90-degree bends. Access to a bending brake is handy here. But the bends can be made with a vise.

Check the bends' accuracy before filing the blanks to shape. Shims can correct minor misalignments, but the finished frames won't take rebending. Bolt the bent blanks together and stand them on a flat surface for a once-over from square or height gauge.

The flywheel is a straightforward lathe job. Painting the drilled web black will improve its appearance in motion.

Or root in a war-surplus shop for a right-size spoked gear. Mount on a stub mandrel, turn off the teeth, and press on a "tire" cut from a pipe coupling. Face off the assembly and you'll have a particularly handsome flywheel.

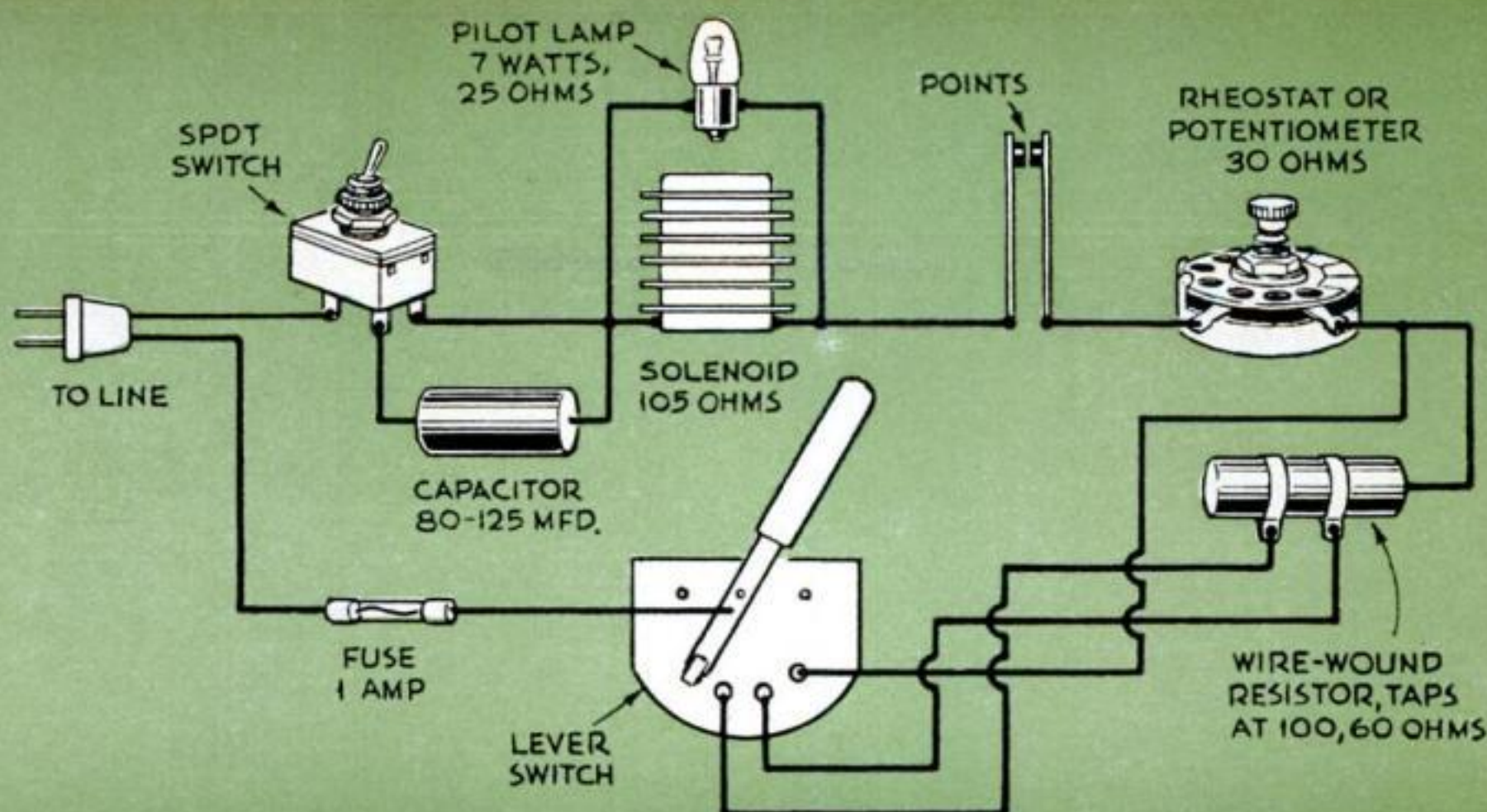
The piston and wristpin are more sophisticated lathework. Drill out the  $\frac{5}{8}$ " 17ST or 24ST aluminum bar. Without removing it from the chuck, fill the hole with a low-melting alloy. (You can un-

## How to Get a Machinist's Blueprint

RATHER work from a separate sheet of drawings in building the little magnetic engine? You can. The editors have made available a real blueprint with all parts shown in plan and elevation. How do you get it?

**Send \$1 to:** MAGNETIC ENGINE PLANS  
Popular Science Monthly  
355 Lexington Ave.  
New York 17, N. Y.





screw the chuck from the headstock for convenience.) Use ordinary solder if Woods Metal or Tuballoy aren't handy. This metal supports the thin wall during the rest of the machining.

After finishing the outside of the piston, reverse it in the chuck. Then turn the bottom end to  $\frac{3}{8}$ ". Drill and ream the  $\frac{3}{16}$ " hole, and file this narrow end flat to fit the connecting rod.

The piston can be coated with colloidal graphite to further reduce friction. Spray it on, and bake the piston for a half-hour at 325 to 350 degrees. This will give a coating .0015" to .002" thick.

Pack the piston with soft-iron wires. You can scrounge these from an old six-volt ignition coil. Cement the wires in place after you have filed or ground them flush with the top of the piston.

The wristpin can be lathe-turned or  $\frac{1}{8}$ " round stock. It's pressed in the  $\frac{3}{16}$ " bushing to increase bearing area. The piston turns on this bushing, not on the wristpin.

Rolling the wristpin between two files can knurl it enough for a tight fit.

**The solenoid cylinder** is made of brass tubing of  $\frac{9}{16}$ " inside diameter. Stainless steel, also nonmagnetic, could be used.

The bore of a brass cylinder should be chrome-plated. This means the cylinder must be soldered to the base and filed for connecting-rod clearance before plating. The piston should be a free fit

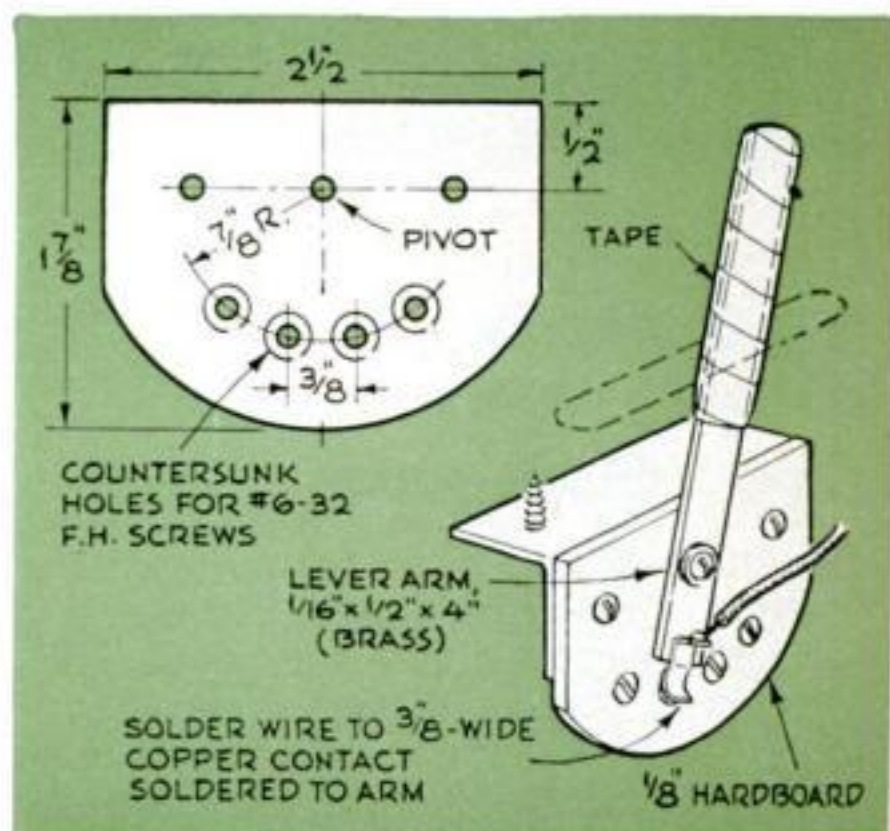
for the cylinder—.004" to .005" clearance.

Slip the bottom iron and two fiber washers over the cylinder before soldering the top iron washer in place. If soft iron isn't available, you can use steel.

The outside of the brass cylinder must be insulated—use tape, varnish, or plastic. Keep this insulation thin to reduce the air gap between coil and core.

Mount the cylinder assembly on a  $\frac{9}{16}$ " lathe mandrel to wind the coil. This will take a half-pound spool of No. 30 en-

[Continued on page 234]



**LEVER SWITCH** to control speed mounts on 1"x1" angle bracket. A commercial single-pole, four-position rotary switch may be substituted; the knob can match the one on the rheostat.



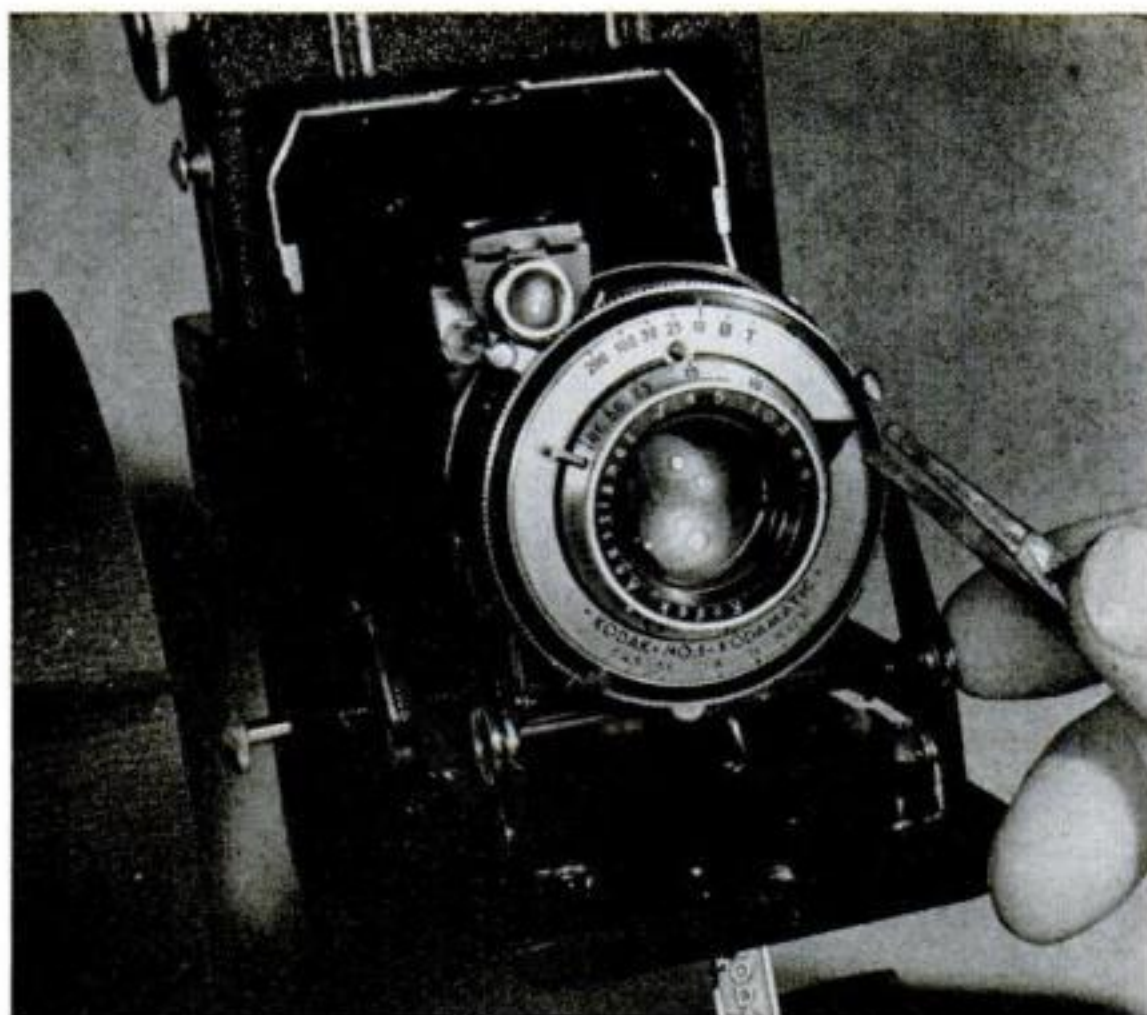
## Short Cuts and Tips

FROM PS READERS

### Self-Timer Warning Tab

IF YOU'RE not in the picture when a camera self-timer lever reaches the exposure point, you've wasted film.

By pasting an arrow of masking tape ahead of the tripper point on the shutter, you'll be able to see when the photo is about to be snapped.—*K. Meredith, Grand Rapids.*



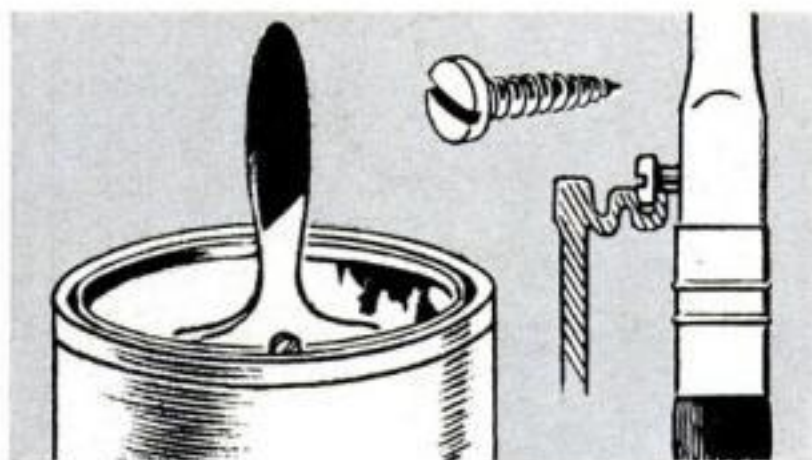
### How to Improve Bags for Cleaner

REPLACEMENT bags for canister-type cleaners can be made from grocery sacks.

Cut out a stiff plate from corrugated board to hold the bag in place. Shape it as shown at left and glue it to the bottom of the sack. Cut a slit to admit the dust, trim the sack to the proper length to fit in the cleaner, and glue the top shut or seal it with tape.—*D. C. Marshall, Manhattan, Kan.*

### Solution to the Case of the Threading Cut (See page 146)

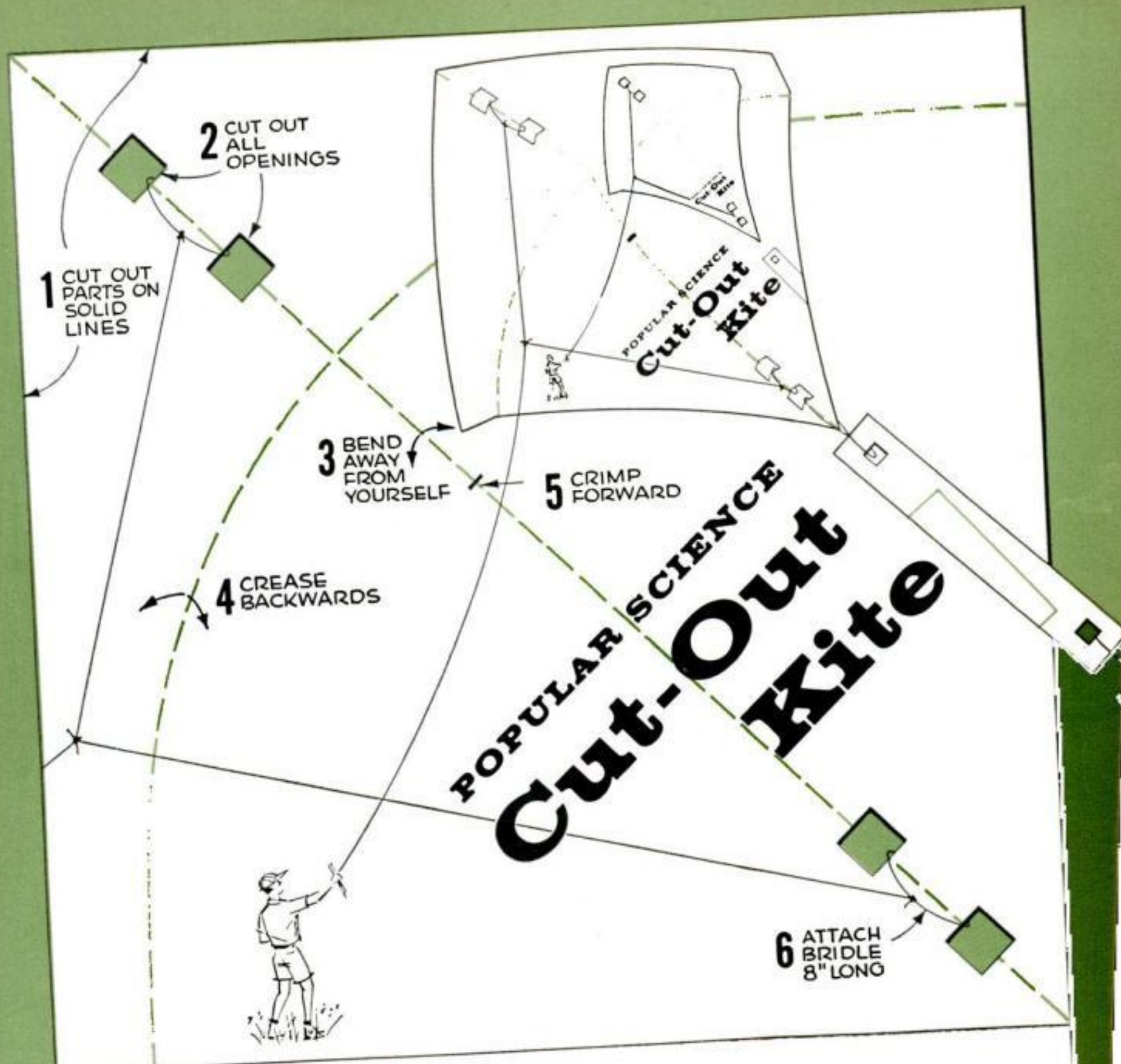
IF JURGENS had just finished a threading cut, the threading dial would have been engaged with the lead screw, and the Lieutenant could not have turned it with a finger. In his haste to get on with the robbery, Jurgens had forgotten to engage the dial gear—something he could not have overlooked when actually cutting an odd-numbered thread.



### Hanging a Brush in a Can

TO HANG a paintbrush inside a can of paint or solvent, drive a sheet-metal screw into the handle. The screwhead will catch on the inner lip of the can.—*Norm Jacky, Seattle, Wash.*





7 ATTACH  
TAIL  
PARTS  
WITH  
1" SPACING

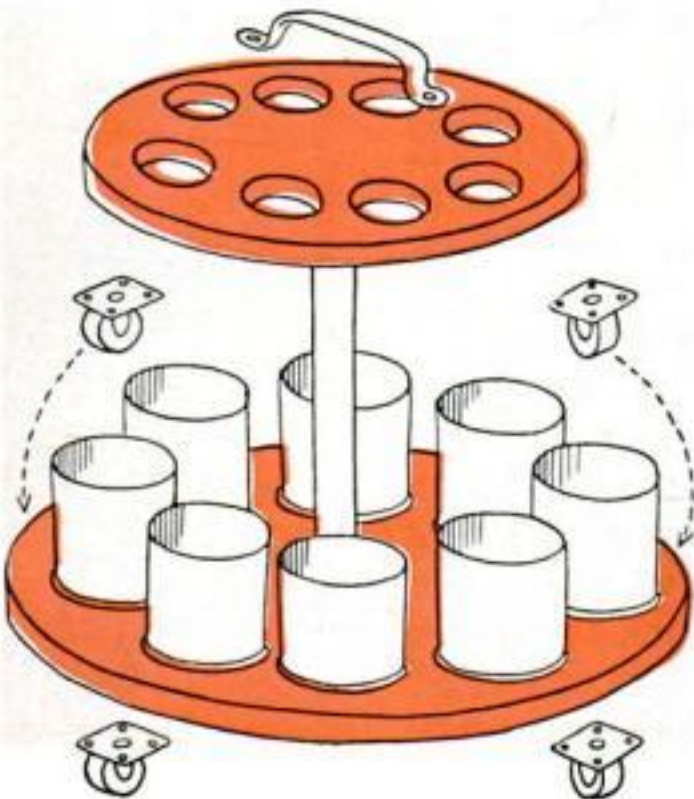
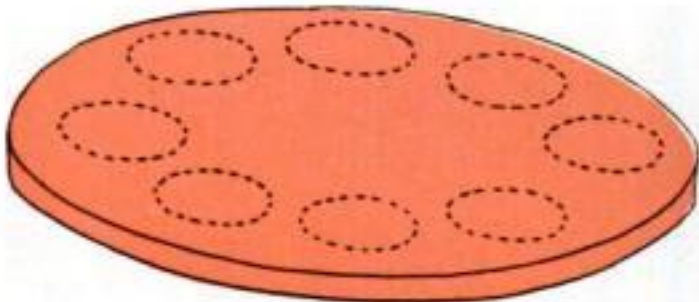
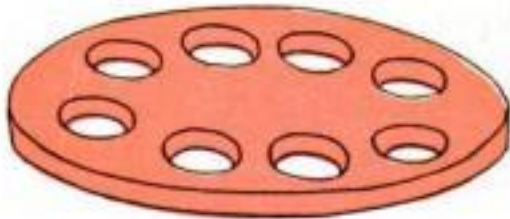
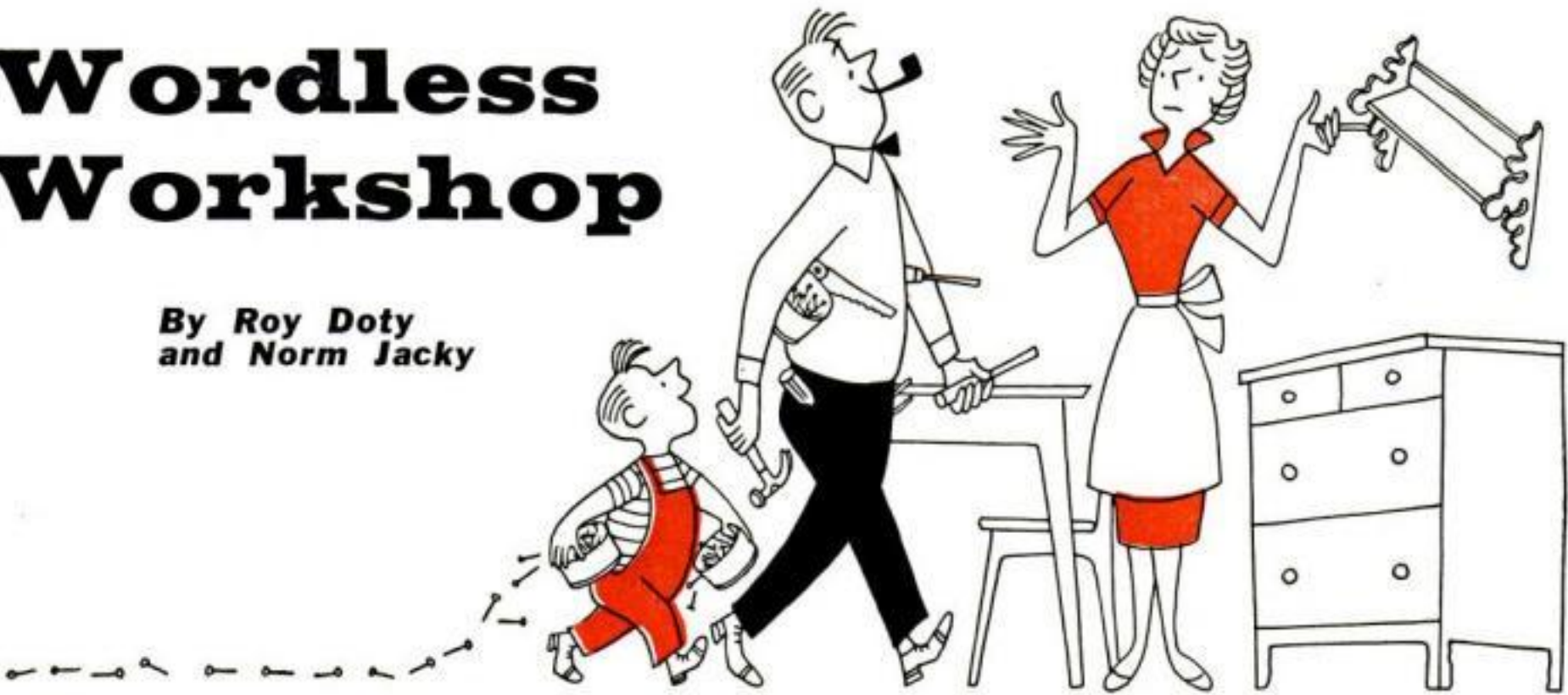
### How to Cut and Fold the PS Kite

THIS KITE will fly indoors if towed at a brisk walk. Make it by cutting along the black lines, folding on the broken green ones. You'll have to cut through these instructions to make the tail—or transfer the pattern to another sheet by tracing over carbon paper. Crimp the kite's "spine" where shown. Tie the main thread about one-third the way down from the top of the 8" bridle (you may need to change this spacing). Tie on the tail pieces an inch apart, and you're done.—*Frank Shore.*



# Wordless Workshop

By Roy Doty  
and Norm Jacky







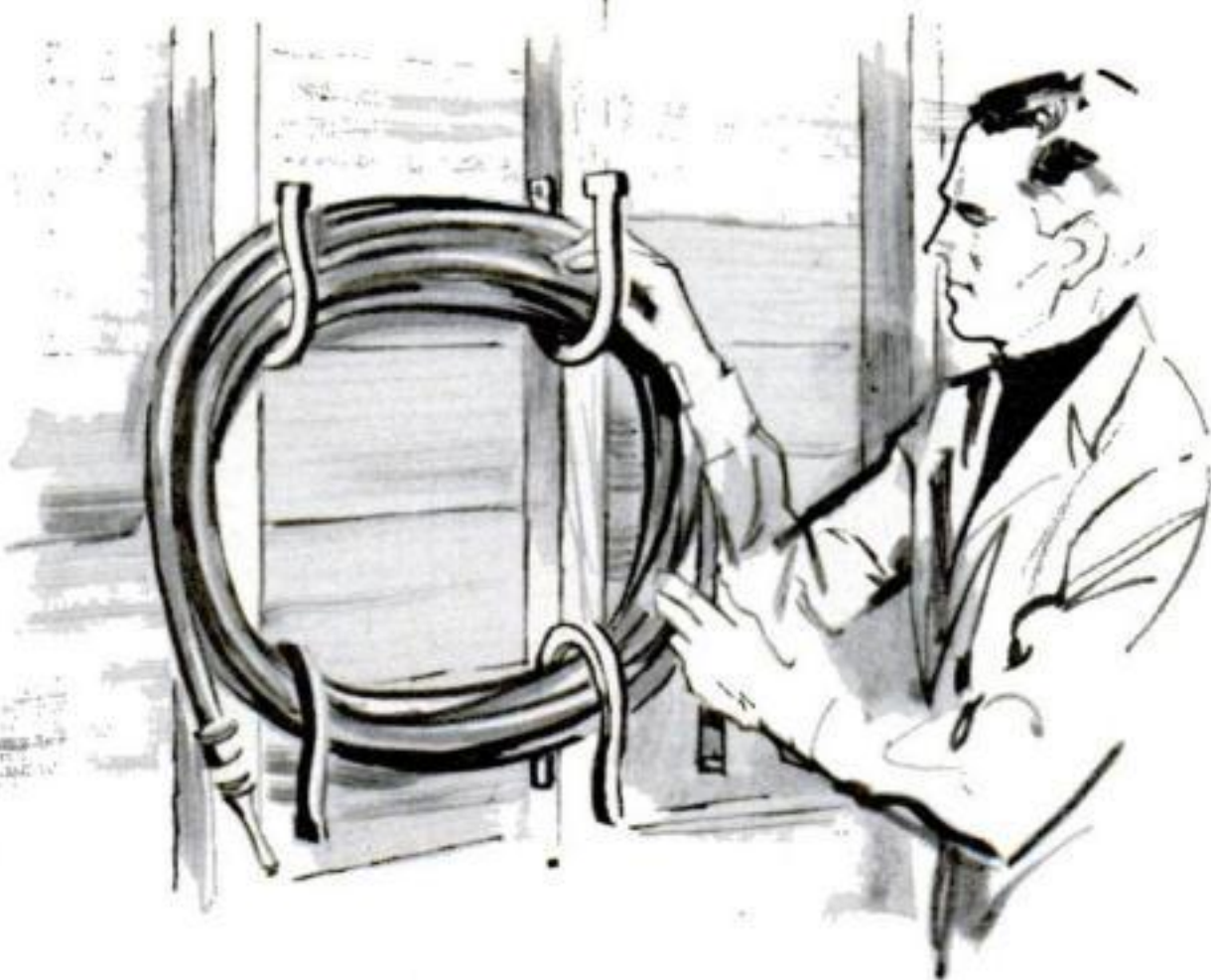


## Short Cuts and Tips

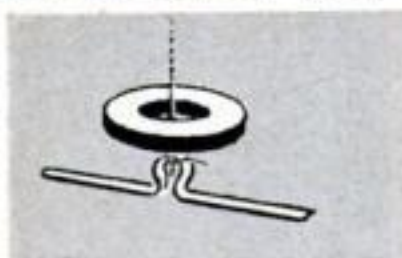
FROM PS READERS

### Rubber Horseshoes Support Hose

Two pairs of hard-rubber playing horseshoes nailed to the studding in a garage or tool shed make a fine rack for storing garden hose. Install the top ones with the open ends up, the lower ones with the ends down as in the sketch at right.—*Vincent H. Lamson, Utica, N. Y.*



### Dispenser for Washers

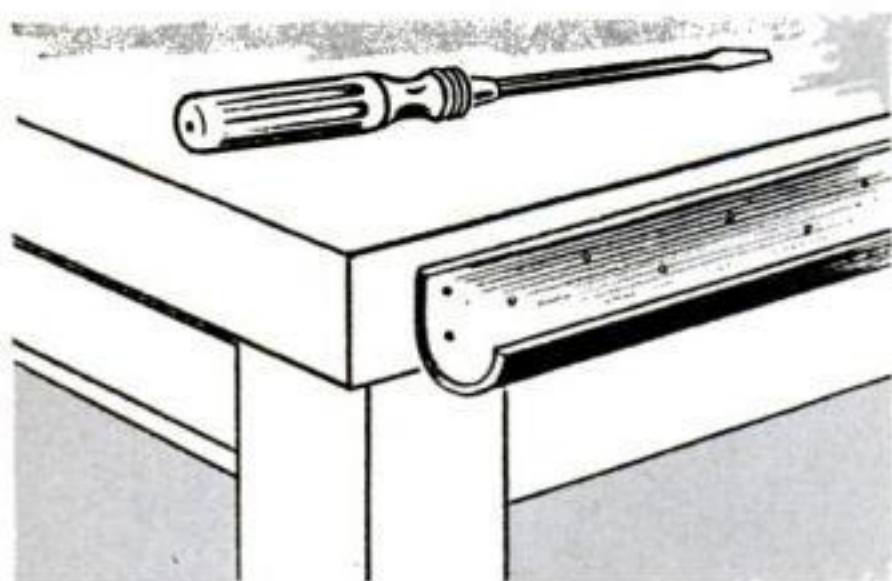


A COTTER pin and a length of string hung near your workbench make a handy dispenser for washers. The cotter pin is bent open and the string tied through the loop. Turning the pin lets a washer slip over it right into your hand.—*John Mihalick, East Liverpool, Ohio.*

### Tags for Identifying Wires

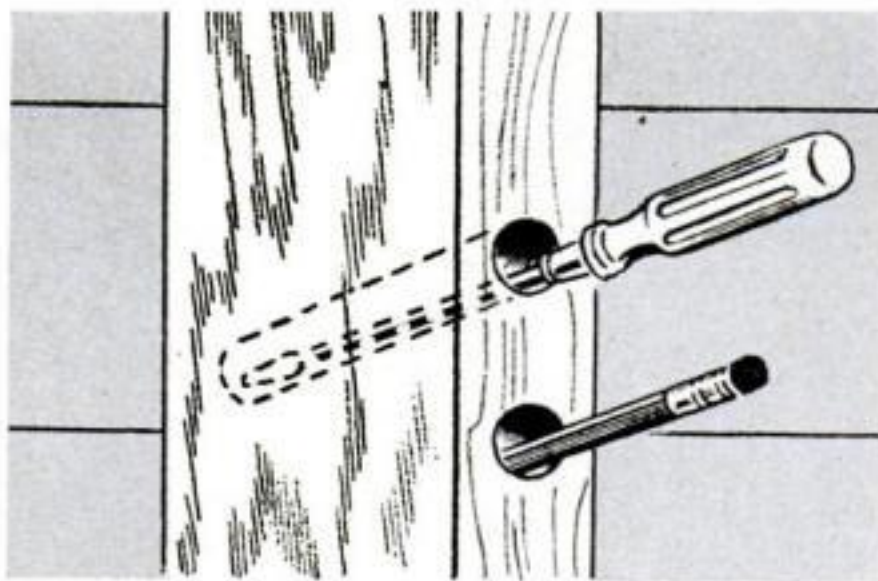


WHEN several wires or cables run in raceways or terminate a distance away from their point of origin, as in some hi-fi systems, key tags are a handy way of identifying them. The tags can be bought in any stationery store, come in various sizes, carry their own attaching wire.—*Hartwell W. Hughes, Inglewood, Cal.*



### Gutter for a Workbench

A TROUGH along the edge of my workbench serves as a catch-all for tools and small parts that roll off the top. I made the trough from a piece of discarded 1½" hose, slit down the center and attached to the bench with flathead wood screws.—*F. Murray, Chicago.*



### Tool-Storage Holes in Studs

IN A SMALL workshop, holes drilled into studs at a 45-degree angle provide handy storage for screwdrivers, pencils, and other small tools. A precaution: Drilling holes too large in diameter or spaced too closely may weaken the stud.—*Jack Norman, Portland, Ore.*



**The camouflage is perfect, the photos really candid. Here's how I hide a—**

# Camera in a Cigarette Pack

**By Phil McCafferty**

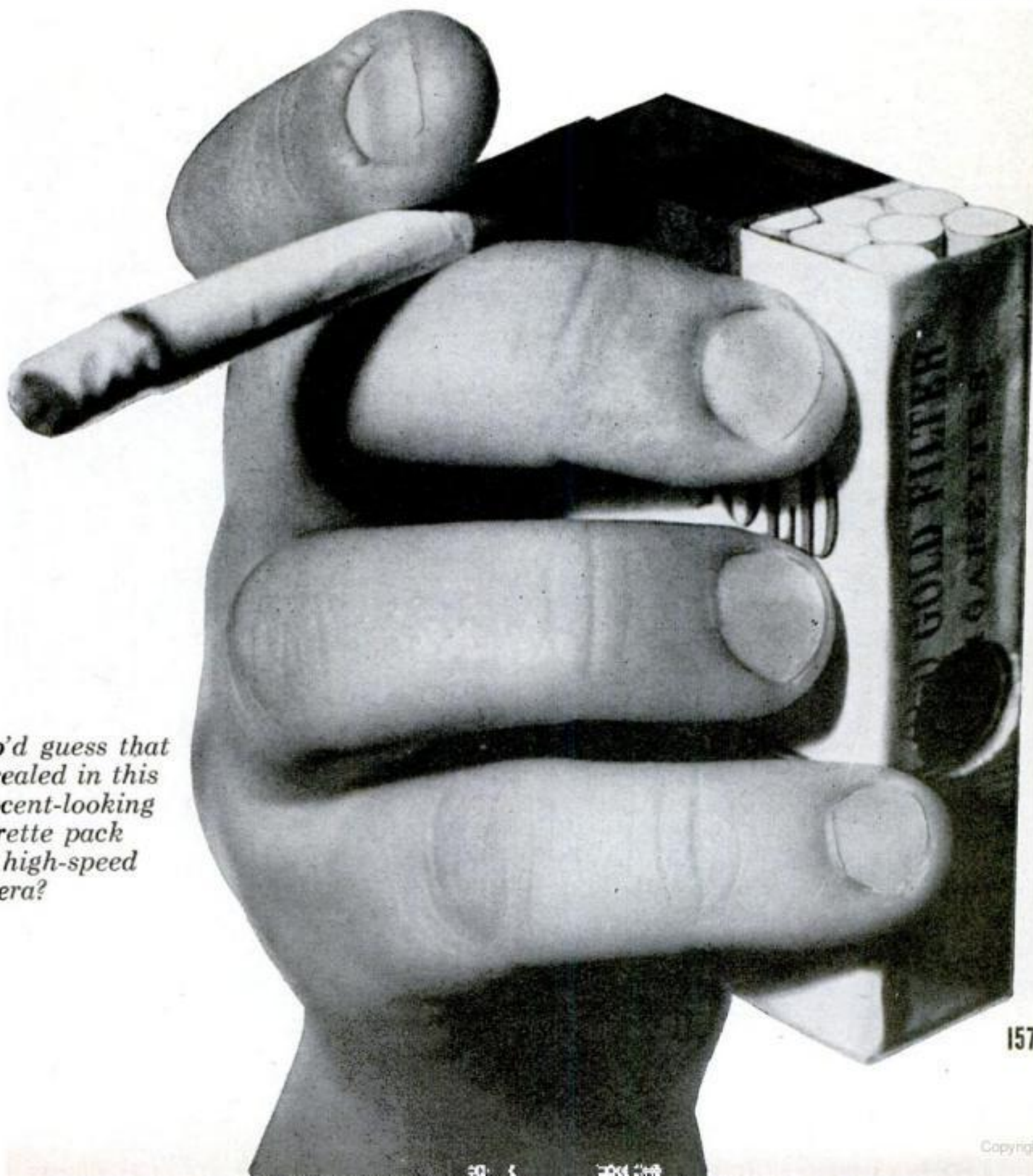
**P**UTTING a false face on a subminiature camera gives you a brand-new kind of picture-taking fun. Since no one can tell what you're doing, you can catch people—especially kids—in odd and humorous poses. You get unrehearsed action instead of the grimness of posed pictures. And if you're like me, you know that the best shots always happen

when you don't have a camera with you. With a subminiature, you can have one with you all the time.

The cameras can be bought for as little as \$20, as much as \$400. Many have all the refinements of expensive large cameras: fast shutter speeds, double-exposure prevention, and film counters. One model I looked at was shaped like a fountain pen. Another could have been made to fit on the wrist like a watch. Another

CONTINUED

*Who'd guess that concealed in this innocent-looking cigarette pack is a high-speed camera?*





## How a hidden camera showed up a cookie delinquent

would have fitted into a candy-bar wrapper.

I finally settled on a Japanese-made Mamiya, which takes 16-mm. film and sells for about \$40. It's a perfect fit for a dummy pack of cigarettes that I made.

I soon learned that you don't snap subminiature pictures with the ease of a TV spy. You have to hold the camera very steady as the shutter is snapped, or movement will spoil the picture.

After a few trial exposures, I learned to estimate the area the camera lens would cover. This eliminated the use of the viewfinder, a dead give-away.

The lenses on these tiny cameras are so fast you need very little light. Using medium-speed Plus-X film, and rating it



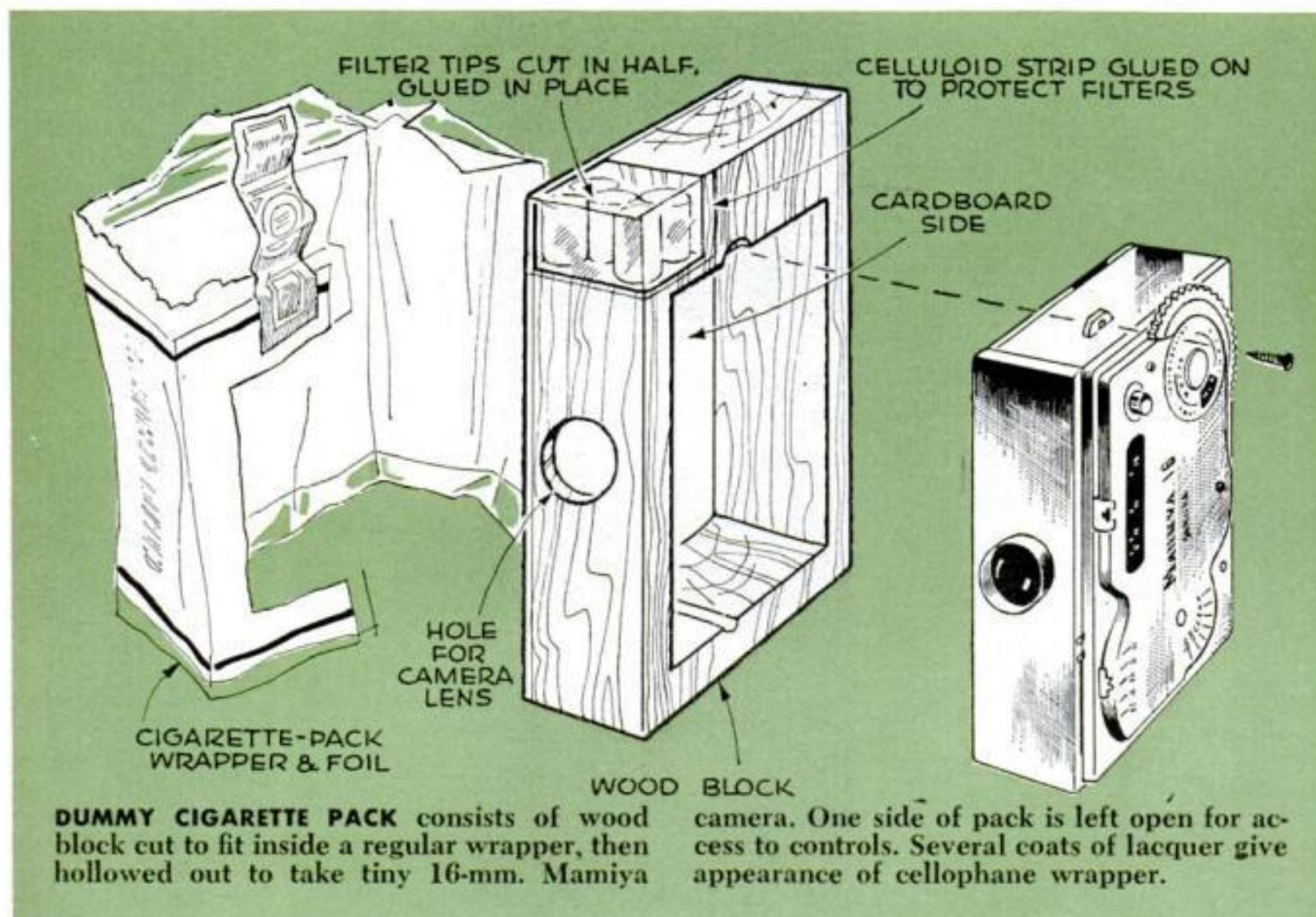
*I'll just sneak one little touch.*



*Why not grab? Nobody's looking.*

at ASA 160, I got fine indoor shots without flash, shooting at  $f/3.5$  and  $1/25$  second. With faster Tri-X film, I could shoot at  $1/50$  second and  $f/4.5$ .

Outdoors in the sun, Plus-X lets you shoot at  $1/200$  and  $f/11$ . Because of the extremely short focal length of the lens, focusing at all but very short distances is not critical. You just sneak up, snap the shutter, and no one knows it.







*Oh, oh—caught in the act.*



*Wow, Mommy can sure get mad!*



*Whew, I was lucky to get out of that.*

### New Tiny Camera Stores Its Own Viewfinder and Filters

THIS new pocket-sized 16-mm. subminiature camera gets its compactness from a retractable viewfinder that slides into the housing when it's not in use. The slide also keeps you from accidentally tripping the shutter while the camera is in your pocket—it won't fire until the viewfinder is pulled out.

Want to use a filter? Instead of fitting bulky conventional filters on the outside of the camera, you have a choice of seven midget glass squares that slip into a slot in front of the lens. Taking up no space, they can be left on when you put the camera away.

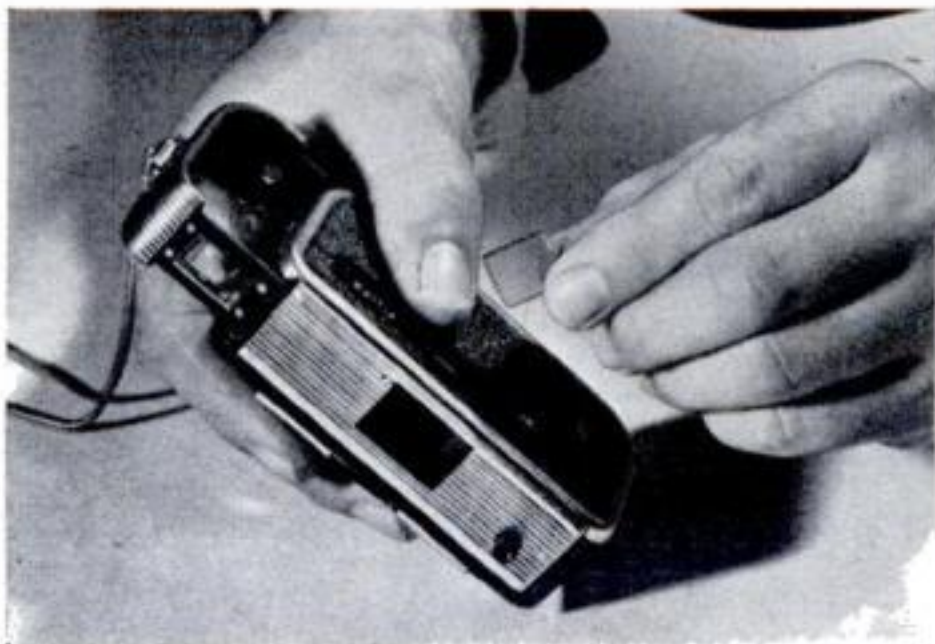
One of the latest subminiatures to hit the market, the German-made import is called the MEC 16. An ingenious system of slide mounts converts tiny half-inch color transparencies so you can show

them in any ordinary 35-mm. projector. The camera has a 20-mm., f/2.8 lens with speeds up to 1/1,000 second. It sells for \$64.50 from Standard Camera Corp., 319 Fifth Ave., NYC 16.



**FIT FOR A POCKET,** MEC 16 is only slightly larger than a pack of cigarettes, weighs eight ounces. With the top closed, the shutter is locked against accidental release, and a sliding metal shield protects the lens.

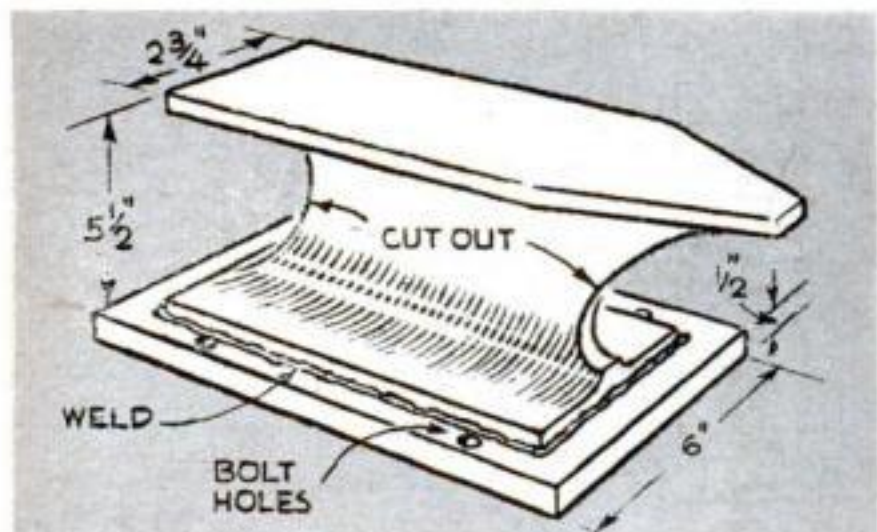
**FILTERS SLIDE INTO SLOT** in side of camera and are locked in. Seven types of optical-glass filters, at \$1.75 each, are available for use with color and black-and-white film.





## Short Cuts and Tips

FROM PS READERS



### Anvil Made from I-Beam

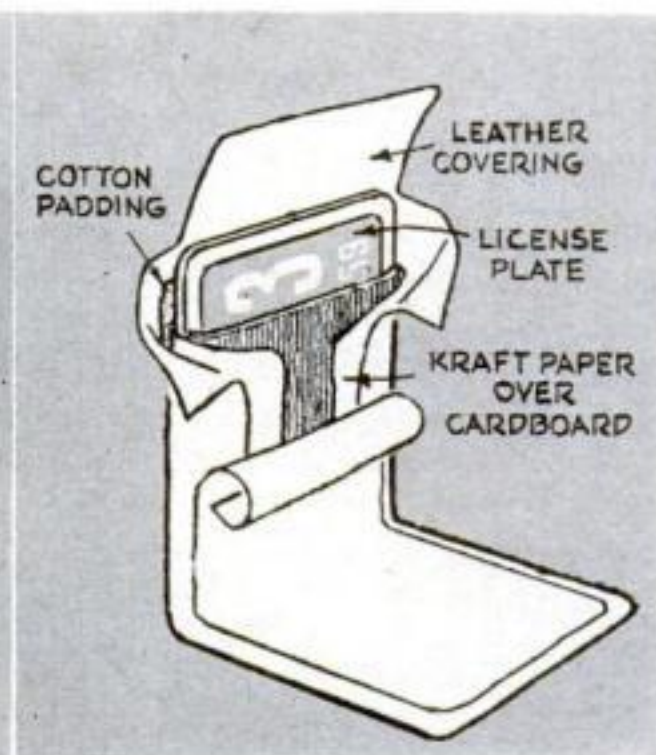
HERE is a simple anvil made from an I-beam and a piece of  $\frac{1}{2}$ " steel plate. It could be made any length; mine is about a foot long. Bolts hold it in place.—*Harold D. Burgess, Battle Creek, Mich.*

▶▶▶WOODEN window screens can be prevented from sticking to the sill by driving brass upholsterer's tacks into the bottom edge of the frame. Use one about 2" from each side. The opening made by the tack heads is too small to admit flying insects.—*J. L. Massett, Washington, D.C.*

### Preventing Faceplate Slip

WOOD turnings held by the center screw to a lathe faceplate tend to slip. As a remedy, try swabbing the plate with a light coat of sandpaper-disk adhesive.—*Walter Johnson, Chicago.*

▶▶▶IF YOU want to add a hole to a nylon watch band, heat the tip of an ice pick. With the band on a block of wood, press the hot point where the new hole is desired. The hole will be round, and lined with melted nylon to prevent fraying.—*Roger Francis, Jamesville, N.Y.*



### How to Make Book Ends from Old License Plates

INSTEAD of nailing your old license plates to the garage wall, you can use them as the framework for a pair of practical book ends. First, bend each plate crosswise in the middle. Sandwich the metal between sheets of thin cardboard, and cover with moistened kraft paper.

When dry, the paper will shrink to provide a smooth surface. Thin leather of various colors and finishes can then be pasted on, much as a book cover is constructed. The vertical ends of the bent plate may be padded with cotton, if desired.—*Robert P. Nute, Cincinnati.*



How a California craftsman made—

# A Wagon-Wheel TV Turntable

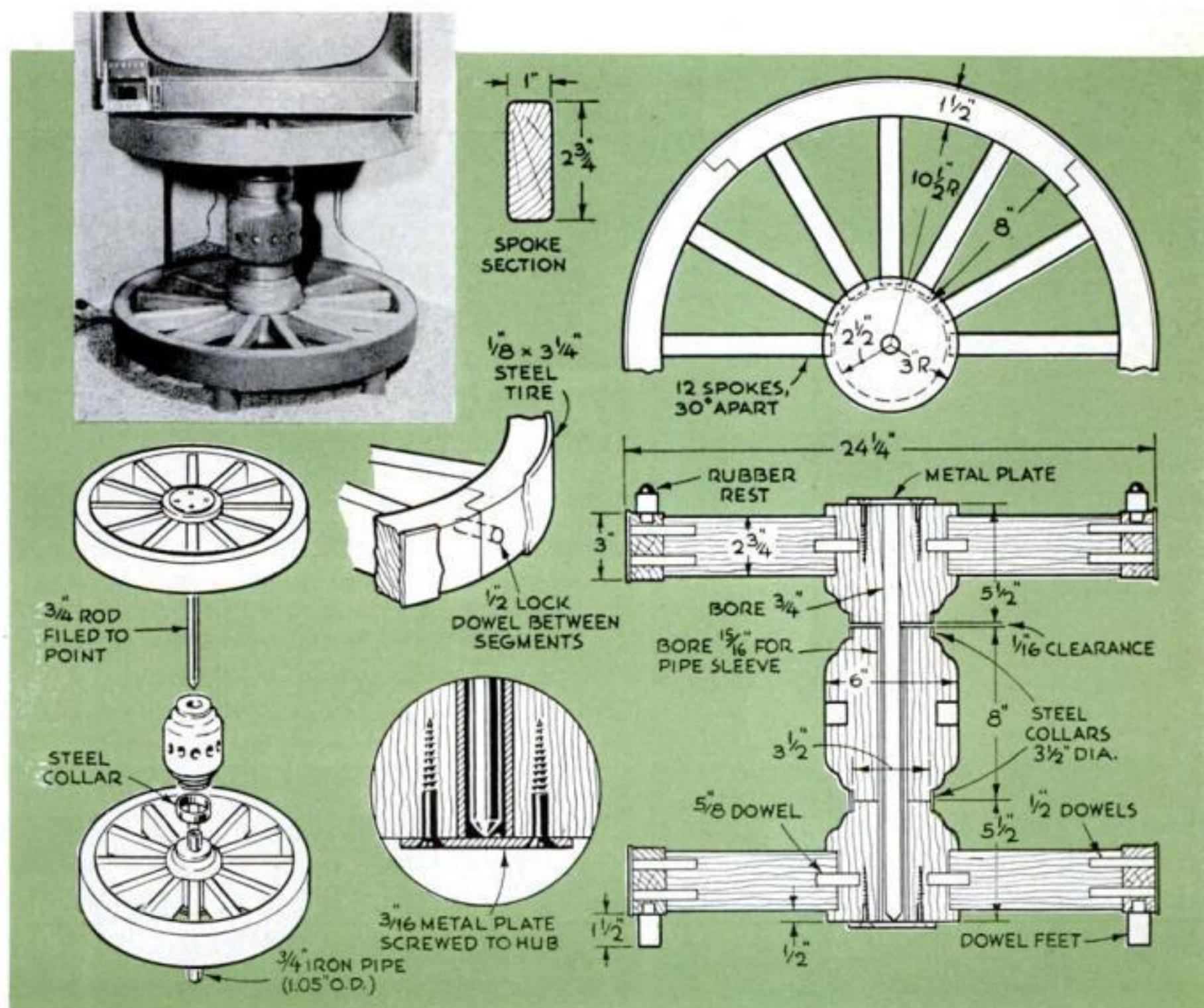
**T**HIS wagon-wheel stand combines the rich beauty of lathe-turned natural wood with a modern swivel for a TV set. The rotating action is very smooth as the entire weight of the set is carried on a pointed steel spindle.

O. L. Rumble of Balboa Island, Cal., copied real wagon wheels for the stand, scaling them down to  $24\frac{1}{4}$ " in diameter. He used birch, but oak or other hardwood could be substituted. All joints are doweled and glued.

The upper hub is bored for a length of  $\frac{3}{4}$ " steel rod, which serves as the pivot. This turns in a sleeve made from  $\frac{1}{2}$ " pipe that runs through a spokeless middle hub and the hub of the lower wheel. All three hubs are turned to the same

contours—except for the grooves for the spokes in the top and bottom ones. The grooves must be carefully shouldered to provide a good square fit for the spoke ends.

The rims are each made up of four 90-degree segments, or felloes, which can be curved on a bandsaw or jigsaw. Mr. Rumble used one-piece, 24"-diameter steel tires. These were shrunk in place over the rims by heating the metal first. For a simpler job, lengths of steel scrap could be screwed on with the joints at the rear where they won't show. Six wood feet are doweled into the bottom rim, and four rubber rests, raised so that the television set will clear the hub, are fastened to the top rim.





Two one-evening  
shop projects:

# Home Magic: Make Your Own Money

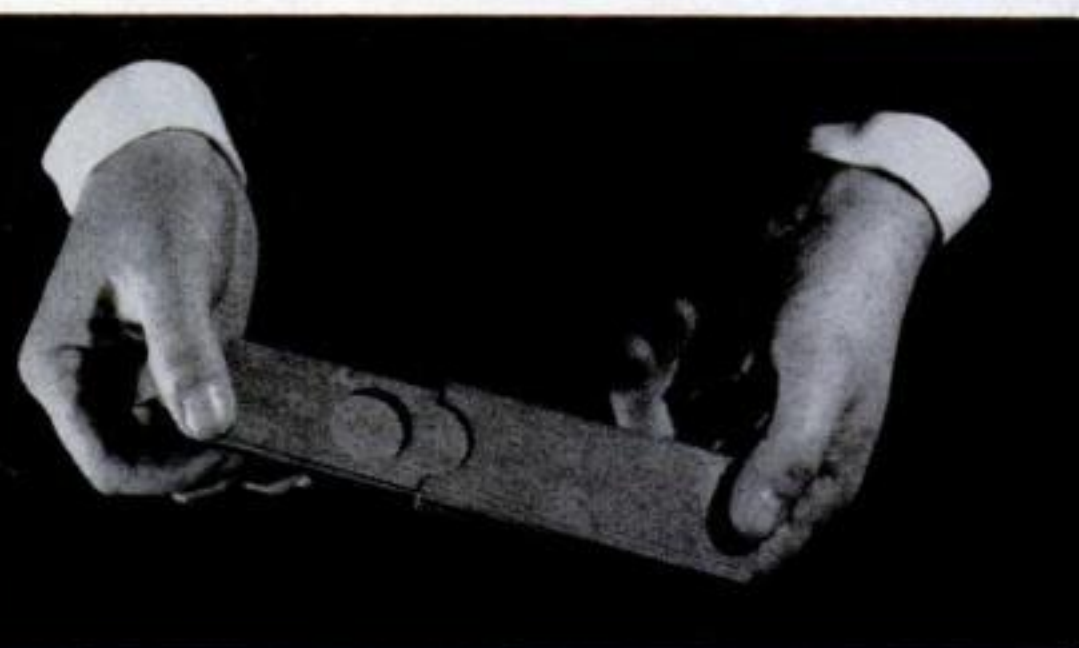
## BILL PRINTER

**CRANK OUT THE DOUGH:** Blank paper goes in, money comes out. Play money is shown, but you can use real bills to amaze your friends.



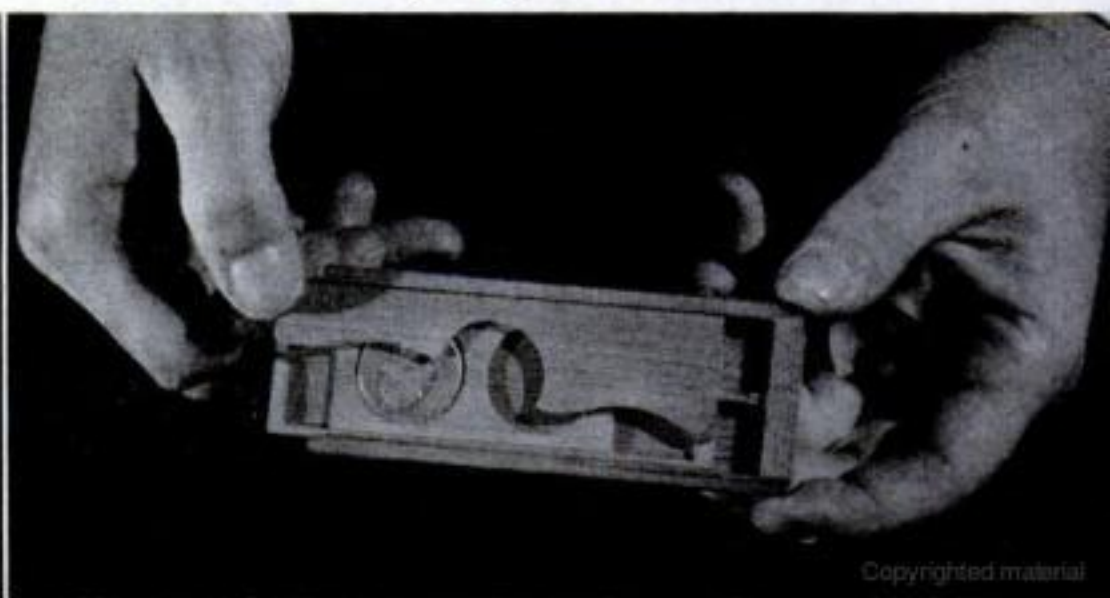
## COIN CHANGER

### How it works



**CHANGE DIMES INTO QUARTERS:** Place a quarter in position in advance and insert the inner box in the outer box to make the pin (see below)

**CUTAWAY REVEALS TRICK:** One or the other of two holes in tray line up with a single hole in inner box when tray is pushed to either side.





## By Burnart Wolfe and Herbert Pfister

**F**EED blank paper into the rollers of a "printing" machine and a dollar bill comes out the other side. Place a dime in a little box and it becomes a quarter. This sound like the answer to all your problems? Yes? Well, actually you plant your own quarter and dollar bill first in a couple of clever props. Then you astonish your audience. Fun is your only profit.

Scraps of cedar or maple can be used to make the gadgets. Either wood can take a lot of handling before becoming soiled, so you won't have to do any finishing.

*The coin changer* is a sliding tray sealed inside a box-within-a-box. The outer box has a pin in its blind end. When you push the inner box into it, the pin slides the tray back and forth to push the quarter into the opening occupied by the dime.

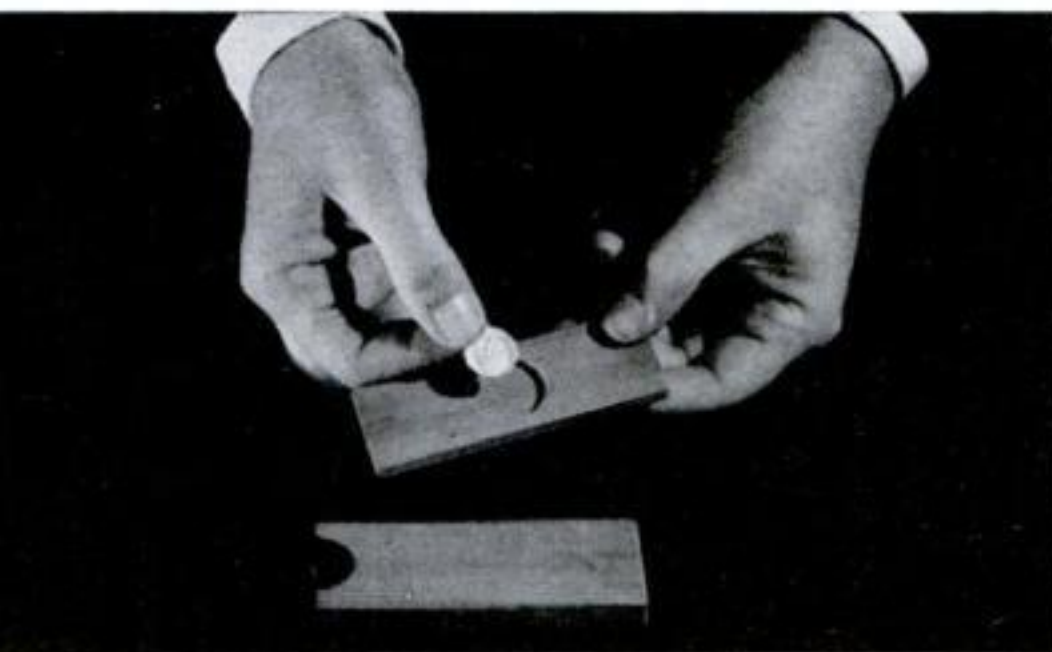
Cut the wood carefully to dimensions given in the drawings, taking particular care with the inner box and tray. Inaccurate fitting of these parts would cause the coin hole to align poorly, giving the

trick away on sight. Sand the tray lightly until it slides easily inside the frame of the inner box, then glue the cover on the inner box to seal the tray permanently inside.

Make the outer box so that its frame fits snugly around the inner box. Glue the pin in place and slide the inner box onto it from both ends to check the travel of the tray. Trim the pin with a razor blade until it is the right length. When you're satisfied that the trick works smoothly, glue the cover on the outer box.

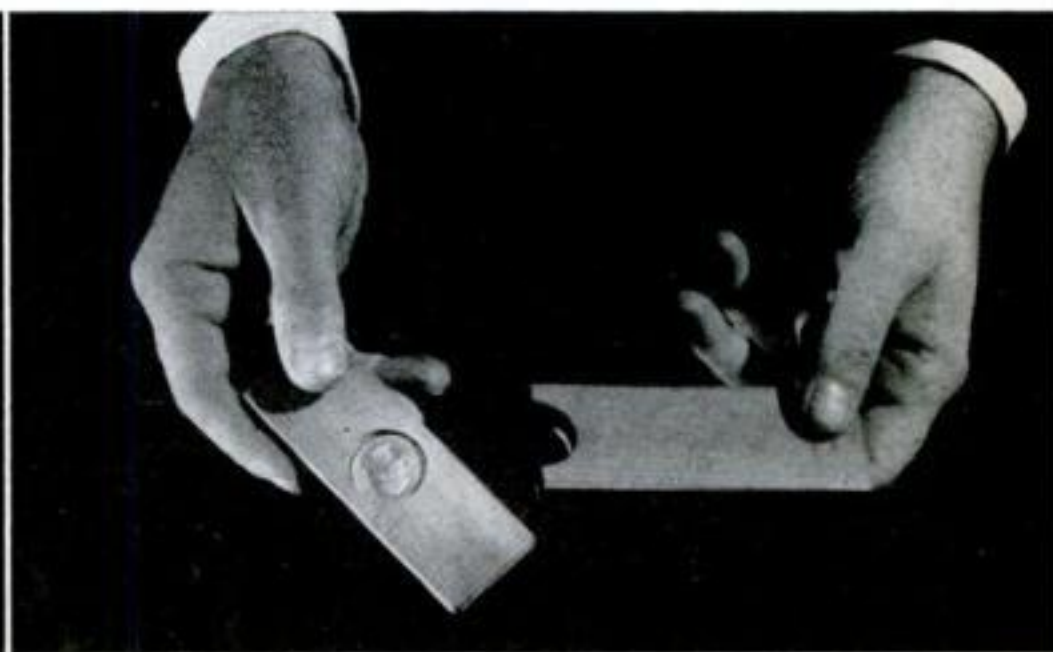
*The bill printer* requires two 4" lengths of 1" dowel and a yard of 4"-wide gros-grain or taffeta ribbon. Black ribbon is best as it conceals what's going on better than bright colors.

Cut the two end pieces and drill  $\frac{3}{8}$ " holes for the roller shafts, then glue the ends to the 4"-wide base. Bore  $\frac{3}{8}$ " holes about 1" deep in both ends of the 1" dowels. Glue  $\frac{3}{8}$ " dowels into the knob and crank. Put a dab of glue on their ends, insert them in the holes in the end pieces and press them into rollers. Support the two remaining roller ends with



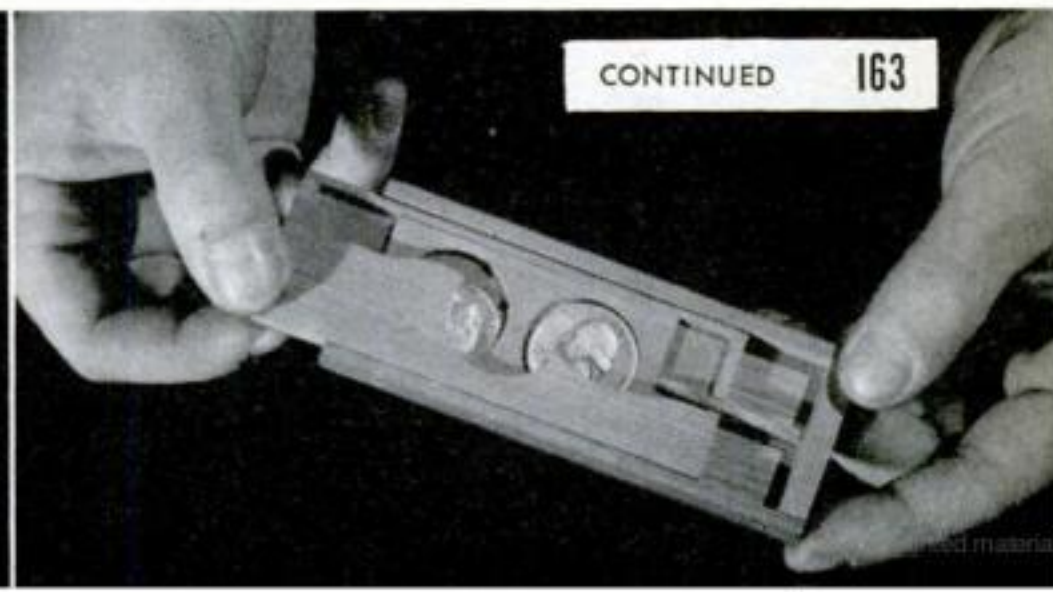
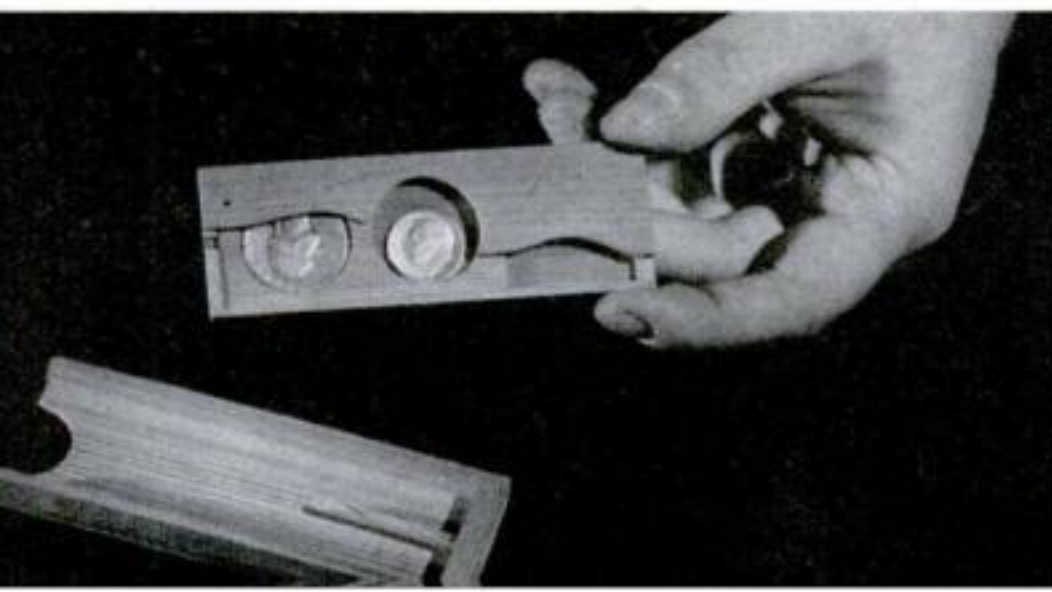
push the coin out of sight. Then, in front of your audience, place a dime in the hole in the inner box. Put the inner box in the outer box and re-

Quarter placed in the hole is shoved out of sight when pin pushes tray, leaving a vacant hole in view as you start your act. The dime is placed



move it while mumbling magic words. The pin will push the quarter back into position to be revealed and shove the dime into hiding.

in this hole. When you put the two boxes together again, this time with the inner box reversed, the pin makes the magic switch.



CONTINUED

163



short  $\frac{3}{8}$ " dowels cut flush with the end pieces.

Glue the ribbon one complete turn around each roller to cover them completely. Note that the ribbon follows an S-shaped path as it moves from one roller to the other. Since both sides of the rib-

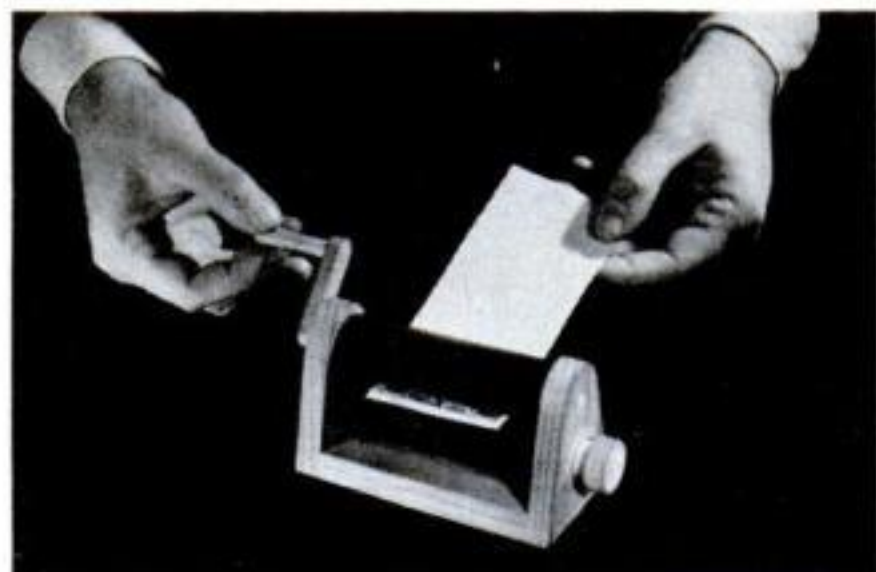
bon are identical, the effect produced is that of two separate cloth-covered rollers saturated with black ink.

Practice a bit before you demonstrate your tricks to an audience. Few performers can look more pathetic than a clumsy magician.

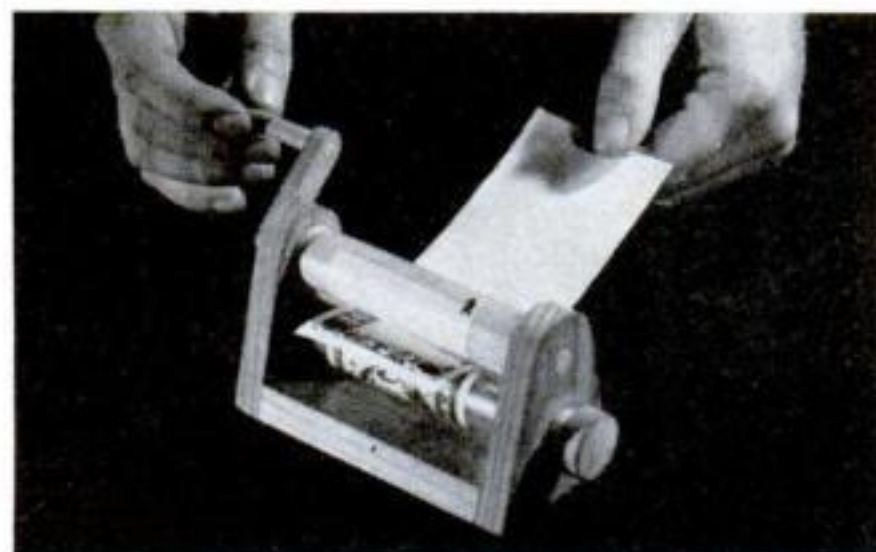
## How the Bill Printer works



**BEFORE "PRINTING" MONEY**, you rig the machine for the trick. Insert a bill, as shown above, and turn the roller knob toward you until the bill just disappears between the rollers.

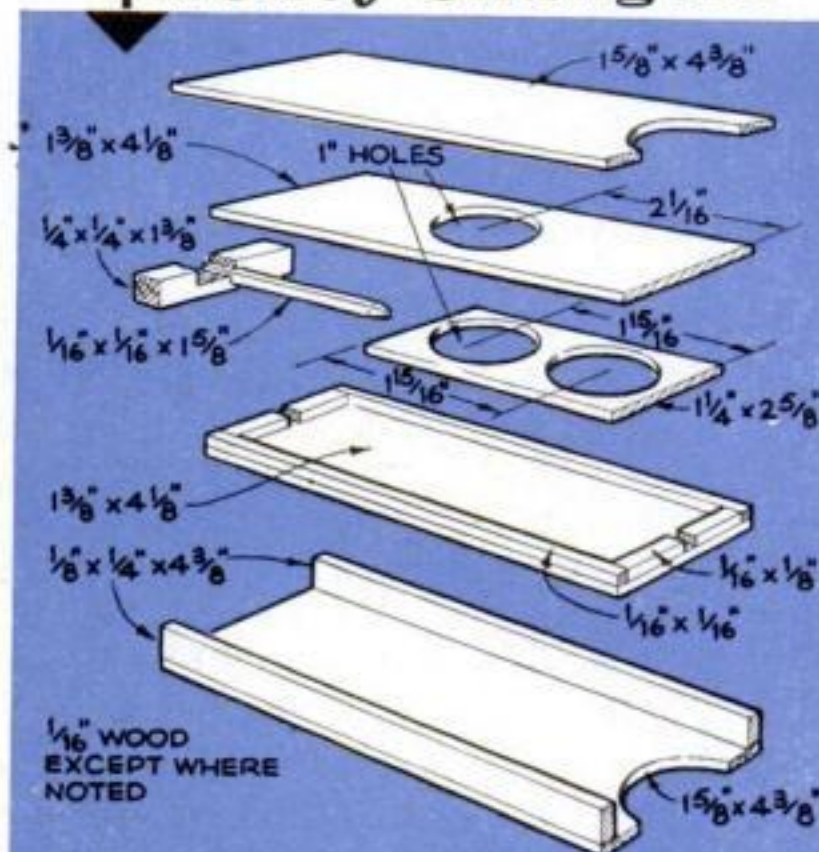


**READY FOR YOUR AUDIENCE**, you slip a paper blank into the rollers and turn the crank toward you, counterclockwise. As the blank enters, the real McCoy comes out the other side.

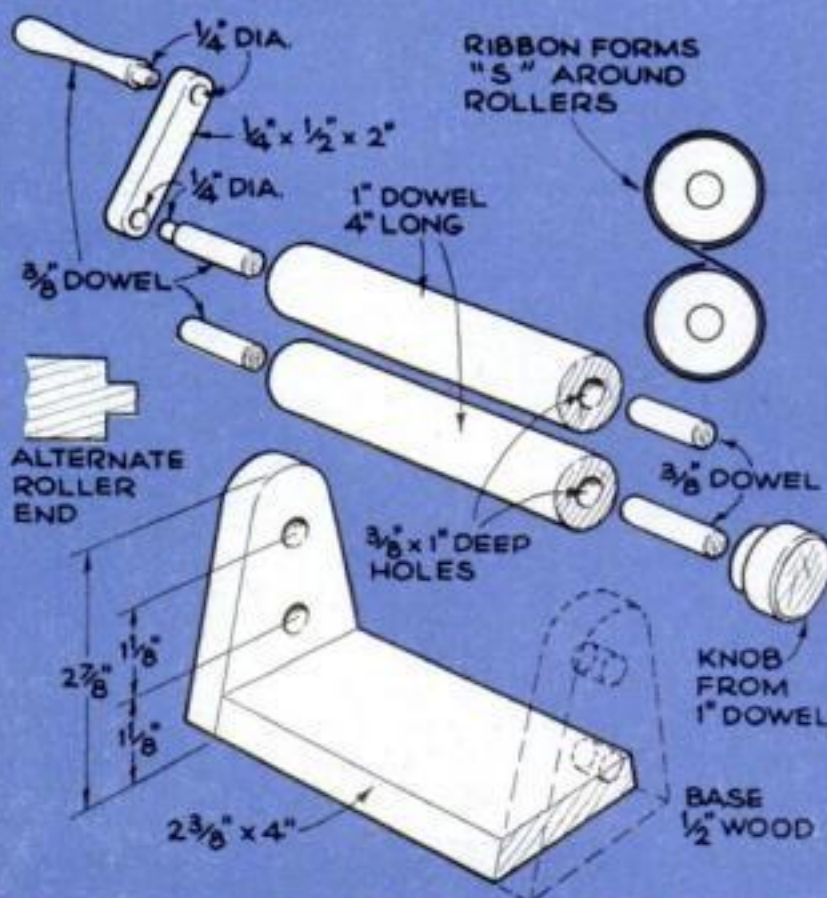


**CLEAR PLASTIC RIBBON** shows secret. Planted bill, wrapped in ribbon around the lower roller, is ready to come out as blank paper is fed into the ribbon around the upper roller.

## How to make the Money Changers



**CUT ALL PARTS  $\frac{1}{16}$ " thick** except sides of outer box. Sand surfaces of parts that slide until you get easy movement with slight drag. Tray should move only when pushed by pin, not by gravity.



**RESEMBLING A CLOTHES WRINGER**, toy-size bill printer is a simple frame of  $\frac{1}{2}$ " wood supporting two rollers of 1" dowel. Buy 4"-wide ribbon first, and build machine exactly to its width so edges are not exposed to give away the trick.



## Short Cuts and Tips

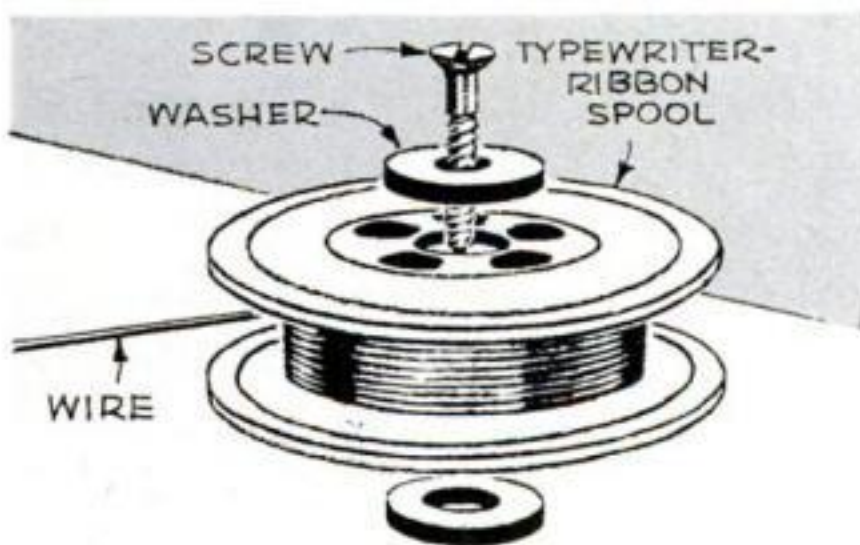
FROM PS READERS

### Drink Mixer Can Drive Models

BATTERY-OPERATED "swizzle" drink mixers make self-contained power units for small ship models. One weighs only four ounces, holds a standard battery, and has a long, removable drive shaft easily adapted to a prop. I buy them for about \$3 each from John Surrey Ltd., 11 W. 32nd St., NYC., or a Hoffritz cutlery store.—*Capt. L. S. McCready, Kings Point, N. Y.*

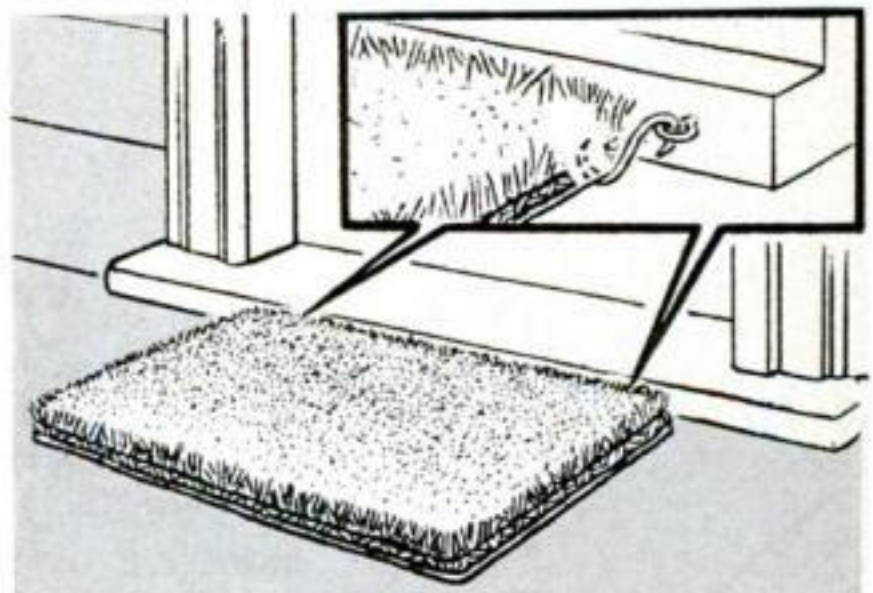
### Dime-in-Hand Is Handy Screwdriver

I ALWAYS keep a dime in the adjustment cover of my telescopic rifle sight. The coin is just the right size and thickness to fit in the cover and for making small adjustments that call for a screwdriver.—*John Krill, North Lima, Ohio.*



### Wire Coiled on Empty Spool

A TYPEWRITER-RIBBON spool, with the old ribbon removed, makes an excellent reel on which to wind light copper, brass, or steel wire. With a washer on each side, screw the spool into a board or studding just firmly enough so it can be turned.—*R. S. Brown, Hyde Park, N. Y.*



### Anchors for a Door Mat

HERE'S an easy way to make a door mat stay put. Work the ends of a pair of large S-hooks into the mat backing. Then attach the other ends into screw eyes driven into the sill edge. Removing the mat for cleaning requires only unhooking.—*Leonard H. Victor, Corning, N. Y.*



**AN ENGINEER'S REFLECTIONS**  
**on how you might go about**

# **Building a Radio- Controlled Dinghy**



**A** RADIO-CONTROLLED dinghy? Could *you* build one? Would it be possible? A boat that would go where it was told to, with nobody aboard to guide it? When that question was raised at PS some time ago, everyone thought it an intriguing idea. So we asked Joseph Whitehill of Easton, Md., a practical engineer, for his thoughts. Here's his answer:

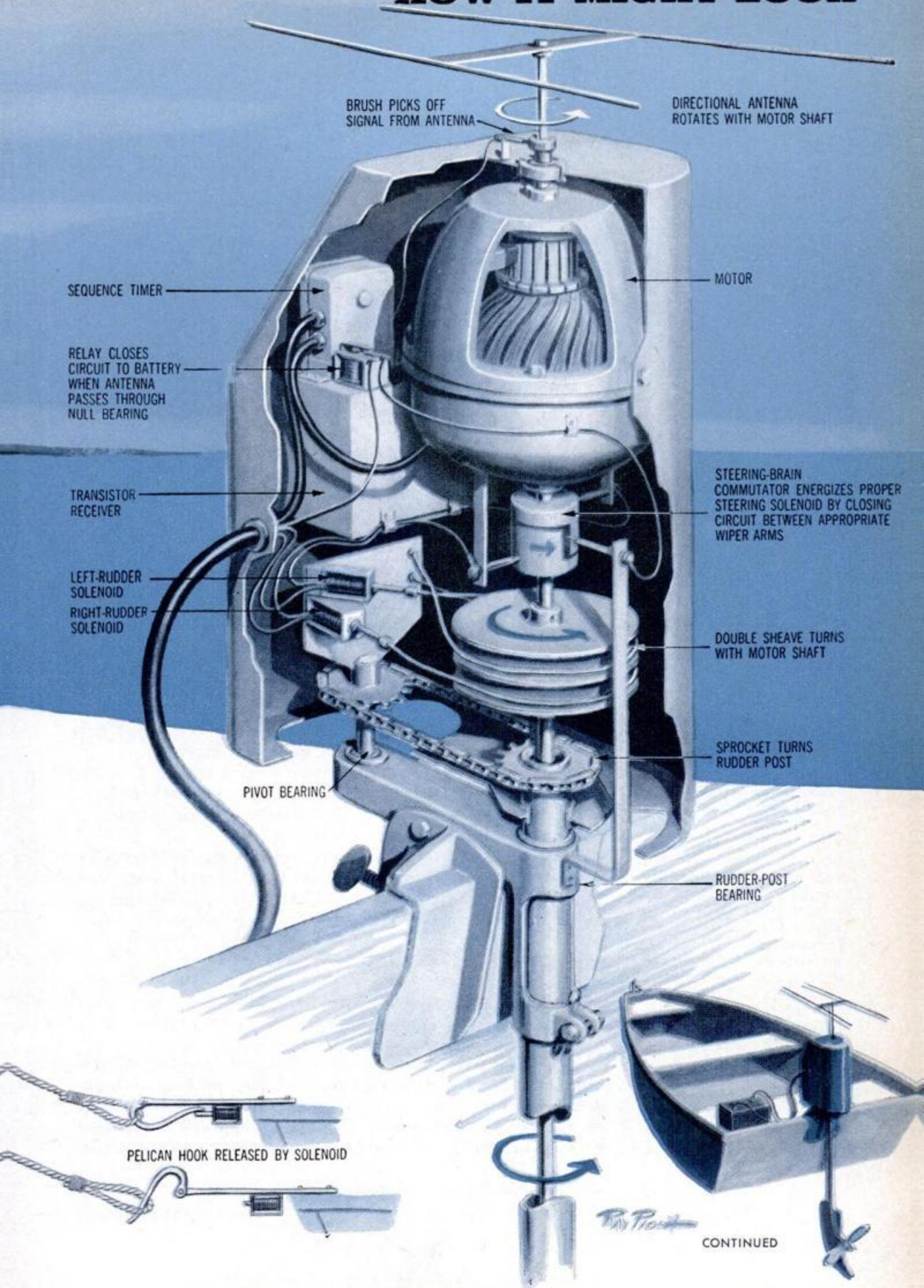
Sure. I figure that it would be fun, and useful, to modify a dinghy so that it would act like an unmanned yacht-club launch. Consider what usually happens: Mr. and Mrs. Cruiser drop anchor and Mr. Cruiser goes ashore. An hour or more passes and the marooned Mrs. Cruiser's temperature begins to rise dangerously.

Now see another scene. Mr. and Mrs. Gadget drop anchor, and Mr. G immediately goes ashore. When Mrs. Gadget gets her hair all fixed for a public appearance, does she fret and boil? Not a bit. She stands on deck in her pretty crinoline and pushes a button on a little black

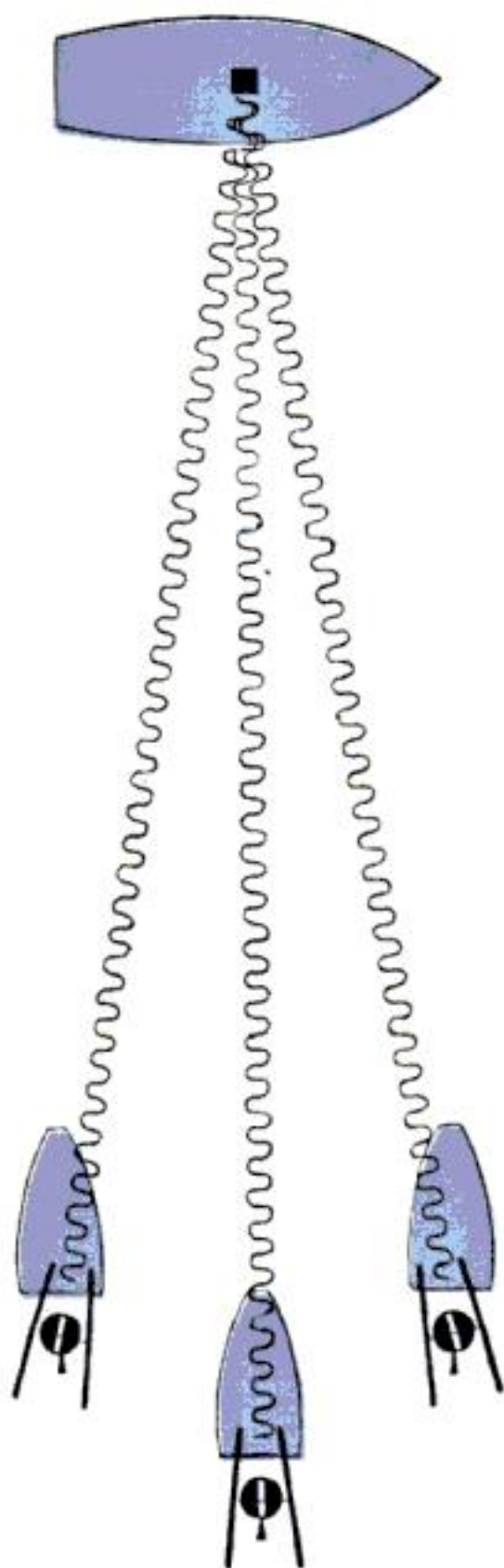




# HOW IT MIGHT LOOK







**INPUT WIPER ARM** is shorted to contact that feeds appropriate left- or right-rudder solenoid, depending on relation of null bearing to boat's heading. When null bearing and boat heading coincide, input wiper arm is touching insulation separating halves of the commutator. Time-delay mechanism holds solenoid until time for the next power pulse. If dinghy heading is 180 degrees off, full right rudder is applied until the boat comes around far enough for the steering brain to take over.

box. Across the water at the landing, the dinghy perks up its ears, backs away from the float, and then churns across the anchorage to the Gadgets' boat.

**Method to the magic.** Technically, this is the simplest kind of homing missile. Clamped to the transom of the dinghy is a little electric outboard, the kind some fishermen use for trolling. Built into the powerhead of this outboard is a transistor receiver, tuned to a Citizen's Band frequency. Mounted on the upper end of the power shaft is a ferrite loop antenna that whirls around whenever the motor is running. Also on this same shaft is a segmented commutator brushed by a wiper arm. This is the steering brain.

**Sequence of events.** When the receiver in the dinghy hears an incoming signal (which is steady and unmodulated in any way), the following things happen:

1. A sequence timer starts.
2. The solenoid-operated pelican hook that is holding the dinghy to the float lets go.
3. The outboard goes into reverse for five seconds to clear the dock, stops a moment, starts up forward.
4. Then scanning by the rotating antenna begins. The dinghy settles down on a course straight for the transmitter. It continues to head for it until Mrs. Gadget takes her finger off the button—whereupon everything shuts off and the boat coasts to its destination.

**How it homes.** The principle is simple enough. As the rotating antenna passes through the null bearing, the signal in the receiver diminishes to nothing. AVC voltage falls, tripping a transistor multi-vibrator that sends a power signal into the wiper arm, contacting a commutator attached to the motor shaft. Depending on the bearing of the transmitter with respect to the commutator (and hence the boat), a left or right impulse is fed to the steering mechanism. This turns the outboard until the dinghy is pointed right at the incoming signal.

To keep the craft from sailing off on a course 180 degrees from the signal, twin ferrite loops mounted slightly off parallel would be used. This would provide a marked front-to-back ratio for the proper course.

**Time and money.** If you're wondering at POPULAR SCIENCE how much it would cost to invent, test, and build the first unit for you, I'd estimate: Miscellaneous, parts, \$250; dinghy, \$150; 80 hours engineering time, \$480; 40 hours machine-shop time, \$120; allowance for bugs, \$500. Total, \$1,500.

This sum doesn't include what you would pay for the article and pictures, of course. But I see no reason why you couldn't have the complete story for \$2,500.

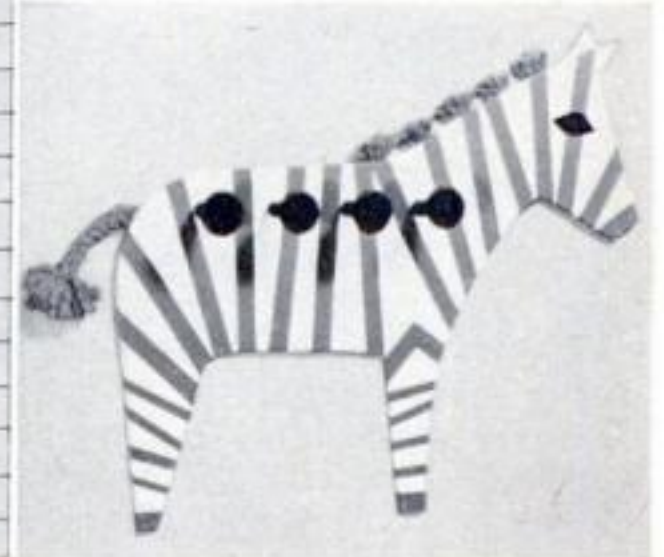
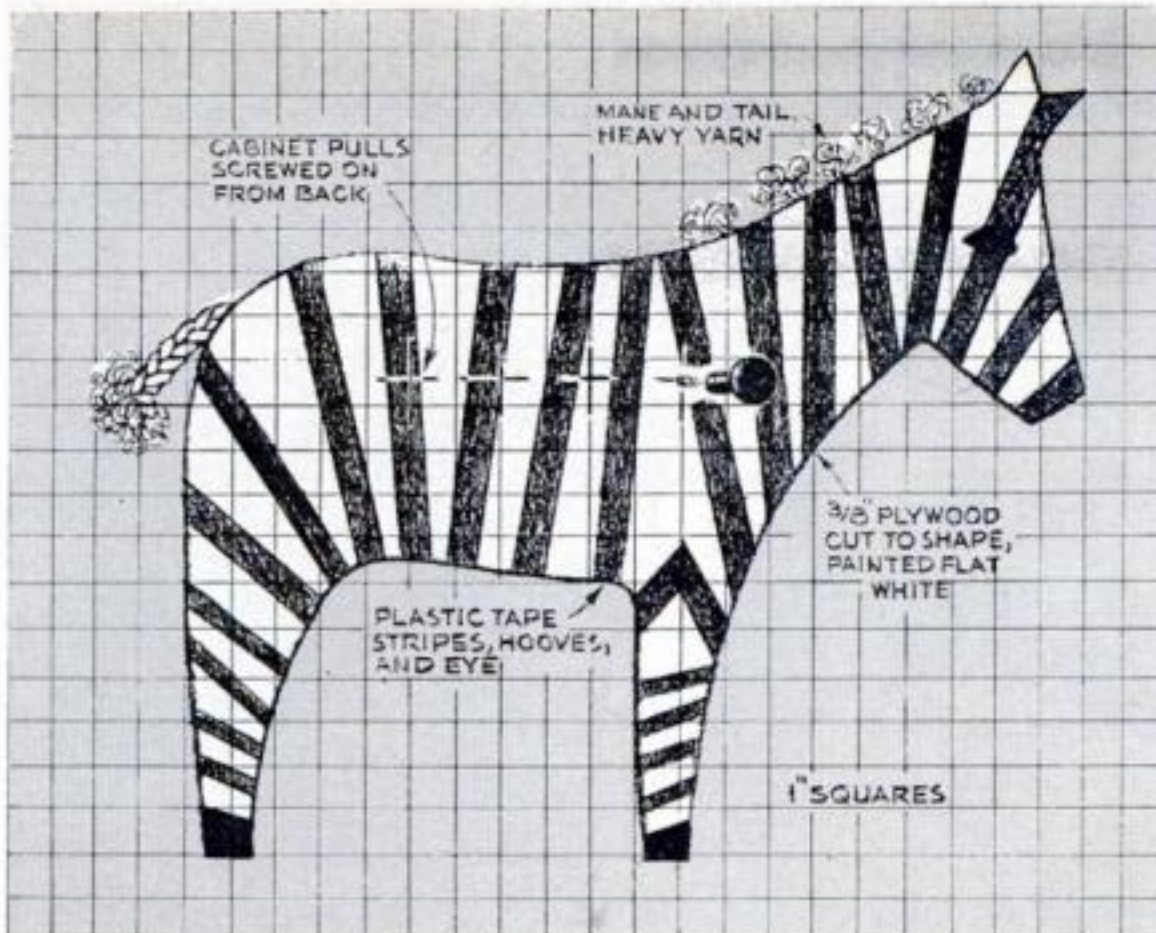
*So there we had the answer. A radio-controlled dinghy was feasible. And it would be fun. But plainly a single article was not worth that much, and we reluctantly called off Mr. Whitehill. His reflections are published here, however, in the hope that some readers might, just for the heck of it, build such homing dinghies. If you do, please be sure to let us see a few photos.*

THE EDITORS



## Short Cuts and Tips

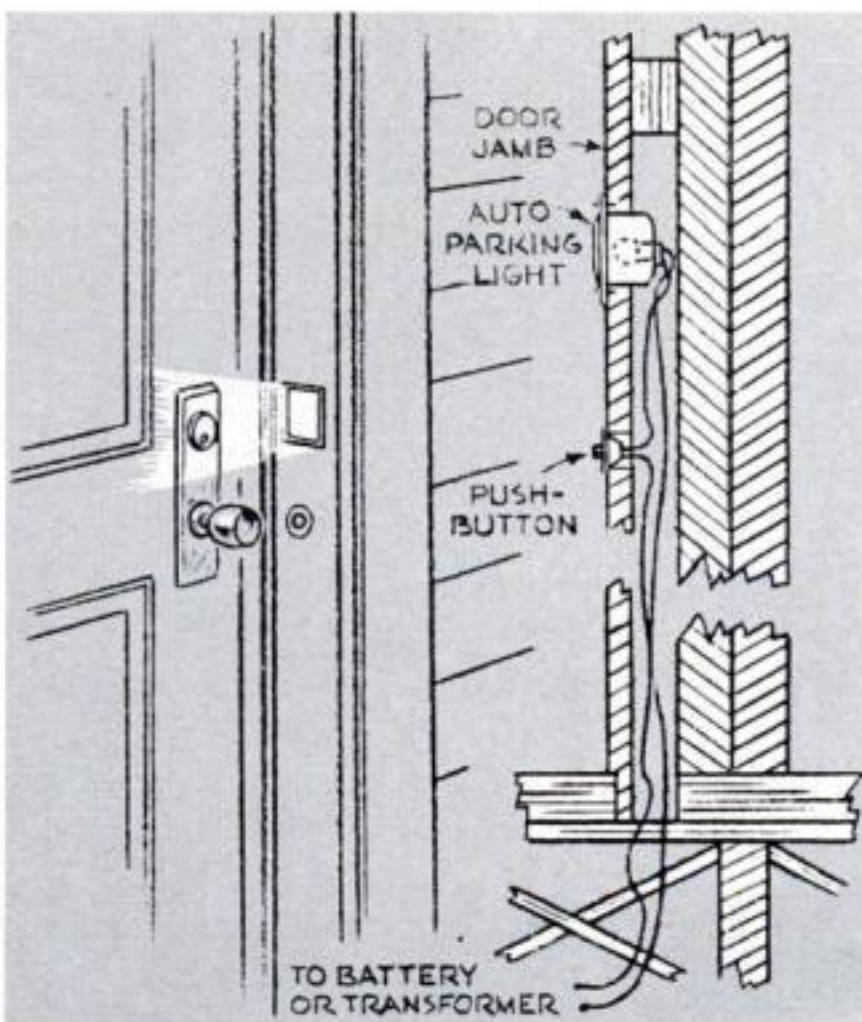
FROM PS READERS



### Plywood Zebra Striped with Colored Plastic Tape

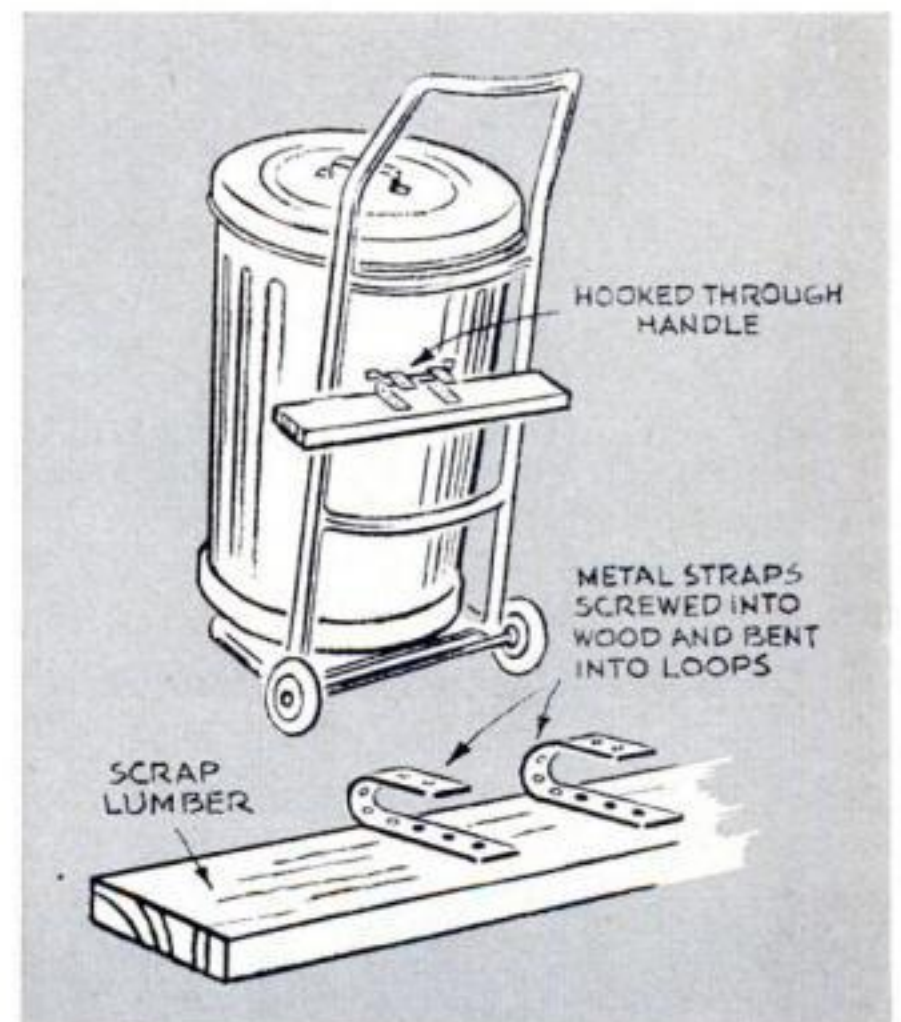
STRIPED to match room colors, this zebra clothes catcher will help remind youngsters to hang up their clothes. It can be hung on the back of a door, or

inside a closet, but the youngster probably will want it out in plain sight. Jigsaw it from plywood, use drawer knobs for hangers, plastic tape for striping.



### Lighting Up a Keyhole

LOCATING a keyhole at night should be easy after this light is installed. A parking light from a junked automobile is recessed into the door jamb. Below the light a doorbell pushbutton is mounted and connected in series with the light. Use a bulb to match the voltage of the battery or transformer in the basement.—Victor H. Lamoy, Upper Jay, N. Y.

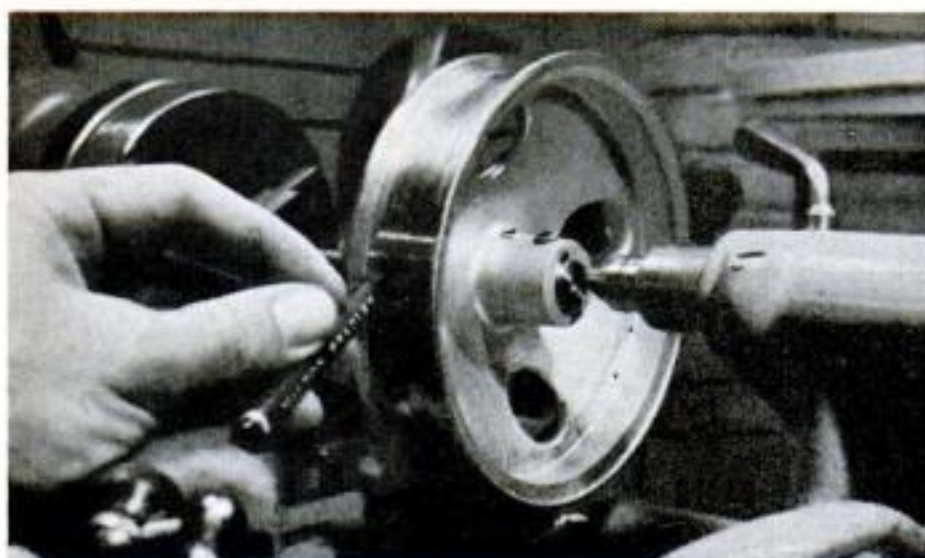


### Grip for Hand-Truck Load

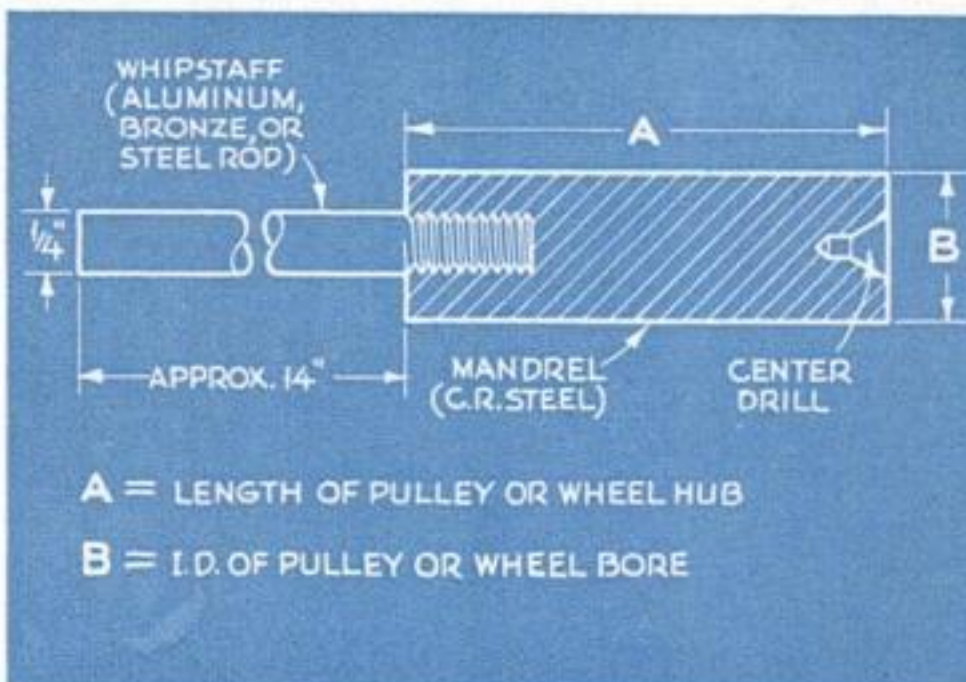
IF YOU have to haul heavy cans on a hand truck, try this simple locking device. Screw two strips of metal strap into a length of scrap lumber and bend them into loops as shown. Hook these through the can handle from the rear of the truck and you have a snug grip that makes handling easier and safer.—T. D. Helm-kamp, Cuyahoga Falls, Ohio.



# One MACHINIST tells another...



**HEAVY SIDE OF PULLEY** is marked automatically by crayon while pulley spins. Hold crayon firmly—not quite touching the circumference.



## Whipstaff Method Does

**A** VERY precise way to check the running balance of a high-speed pulley is to use a whipstaff. Mount the pulley on the mandrel and chuck the springy wand four or five inches away from the pulley for your first trial. Using the dial indicator on the pulley, roll the chuck slowly by hand. Bend the wand slightly, as necessary, until the pulley runs true on both its diameter and face. The wand may sag somewhat if the pulley is relatively heavy, yet with a little patience and care in bending the wand you can make the pulley run true—sag and all.

Next, run the tailstock center lightly into the center hole in the mandrel and

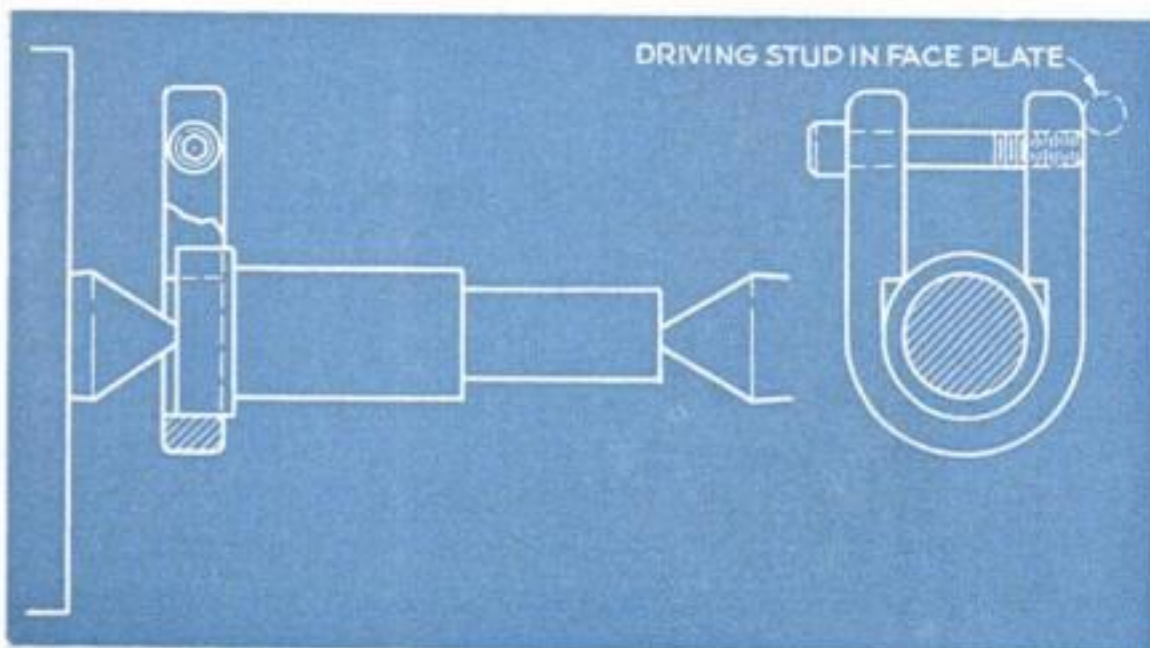
start the lathe at a fairly slow speed—say 300 r.p.m. Hold a crayon not quite touching the pulley, then ease the tailstock center out of the center hole in the mandrel. Immediately, the heavy side of the pulley will whip out and strike the crayon. The mark will show where to remove excess weight.

Before taking the pulley off the mandrel, scribe matching lines on the hub and mandrel so they can be replaced exactly as they were. Now remove the pulley and judiciously lighten the heavy side by drilling holes in the web near the rim. Return the pulley to mandrel (remember to line up the scribed marks)

## Driving Dog for Lathe Work with Narrow Shoulders

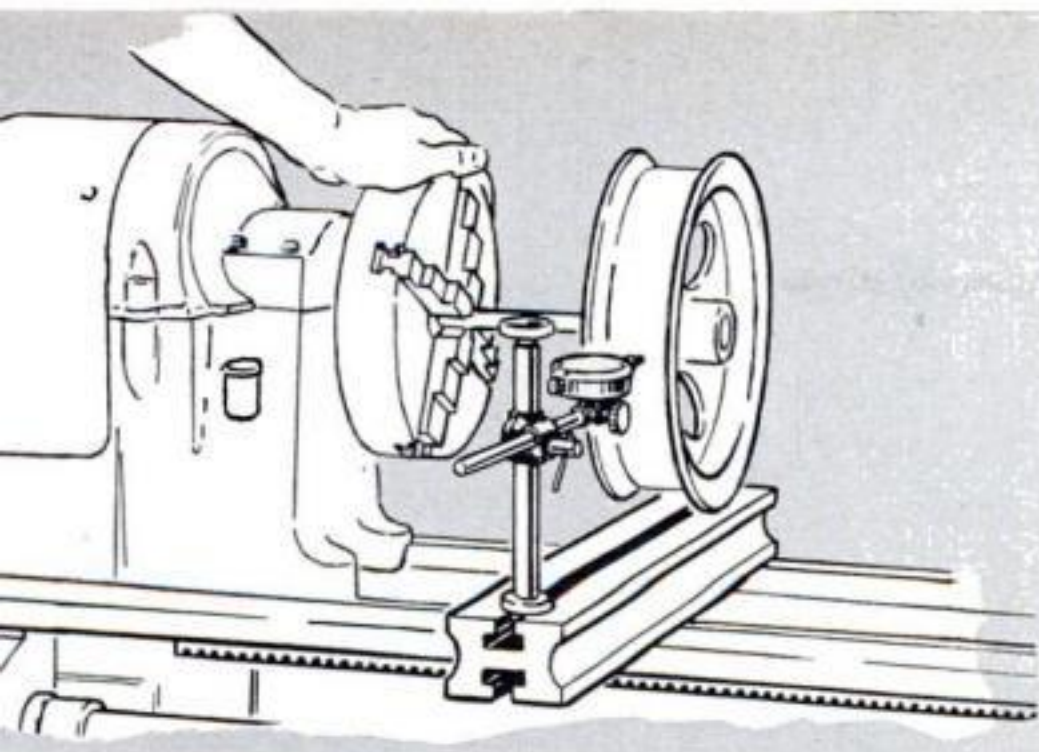
**A DRIVER** I made for the job makes it easier to turn work having shoulders too narrow for a standard lathe dog. It is

simply a suitable length of  $\frac{5}{16}$ "-square stock with a centrally located notch cut about halfway through. Length of the

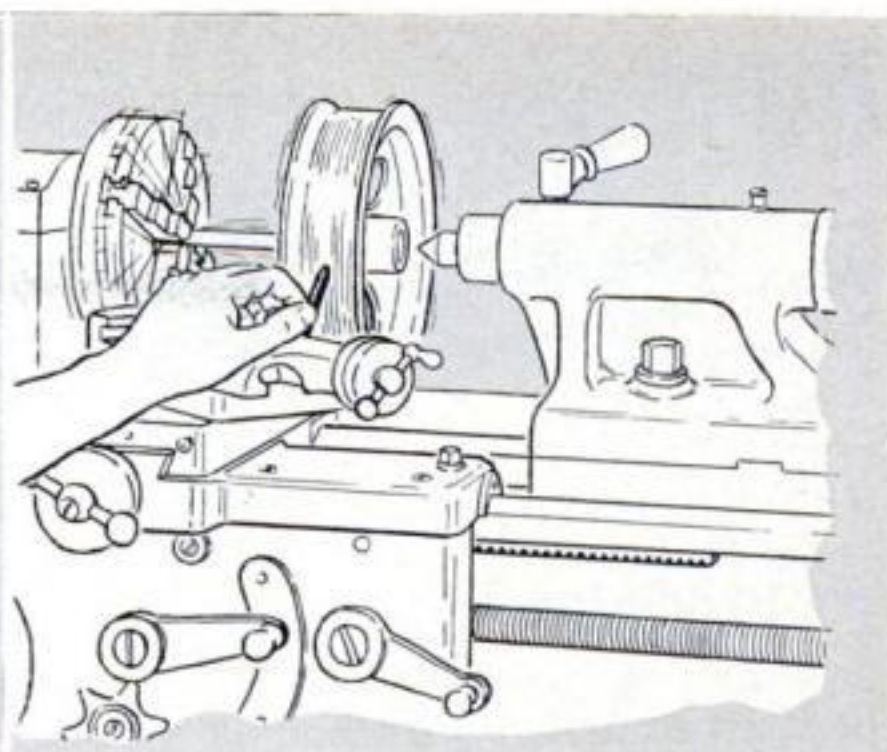


notch should be such that when the piece is formed in a U shape, the ends of the notch will grip the work as shown. The tails are drilled and one is tapped for a #10-32 socket-head screw. Tightening the screw causes the corners of the notch to bite into the work for a positive drive. Time is saved because you can turn all diameters from one end. —F. Murray, Chicago.





**WAND IS CHUCKED TRUE**, then face and rim of pulley are made to run true by bending the wand slightly, as needed. Use a dial indicator



and turn chuck slowly by hand. An unbalanced pulley will immediately run out when the tailstock center is backed off while lathe runs.

## Precision Balancing

and repeat the entire operation. As you reduce the imbalance, you can increase the lathe speed. When the pulley seems to run perfectly true at top speed, chuck the wand farther away from the pulley for more and more sensitive indication.

Practically speaking, the perfection of balance you can achieve is limited only

by your patience. The wood-shaper motor pulley shown in the photo was so grossly unbalanced that it shook the whole shaper. Less than an hour's work devoted to balancing it, using the method outlined, produced a pulley that is better balanced than the factory-balanced motor armature.—*J. Whitehill, Easton, Md.*

▶▶▶ **WHEN** you are doing heavy drilling or reaming in the lathe, the taper sleeve will sometimes turn in the tailstock if it has no tang to lock it. I have found, when this happens, that chalking the sleeve will usually make it hold.—*Albert Levesque, Somerset, Mass.*

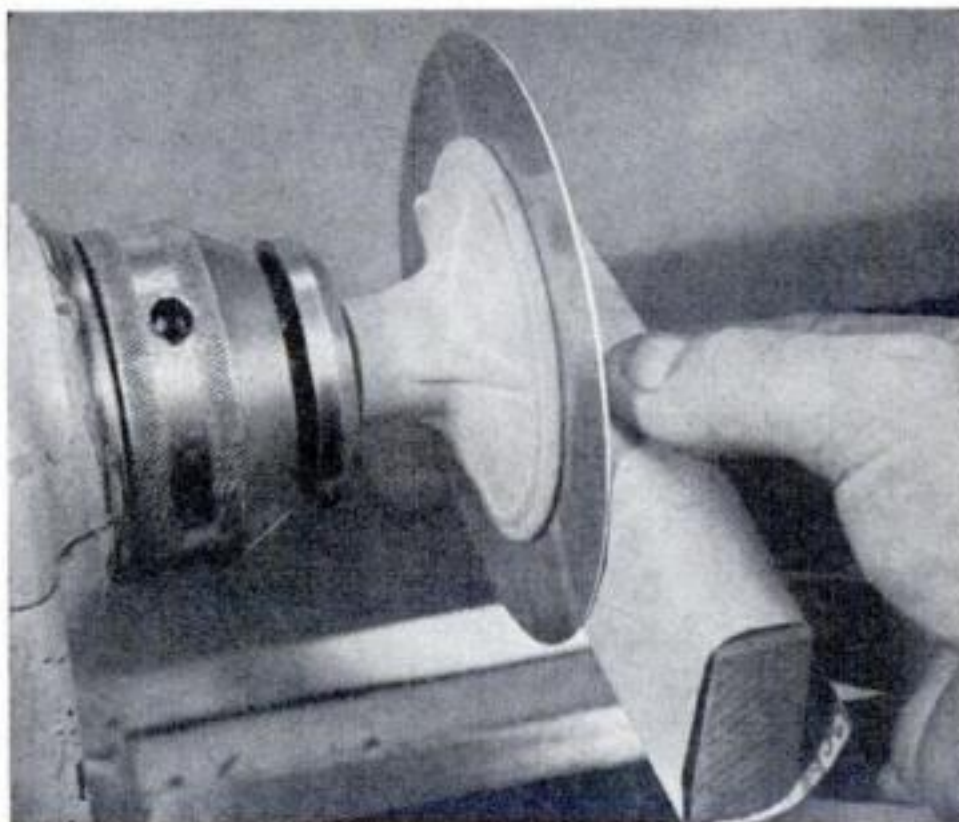
▶▶▶ **REMOVING** an old roller-bearing outer race can be quite a problem if you can't get at it to drive it out. One man runs a bead around the race with an electric welder. When the welding bead cools, the cooling will usually shrink the race enough so that it falls out of place.

## Suction Cup Holds Thin Work for Polishing

A **LARGE** rubber suction cup, like those used on car-top luggage carriers, makes an ideal chuck to hold thin disks for polishing in a lathe.

The steel nut embedded in the shank of the cup makes it easy to mount it. Cut the head off a bolt, or use a threaded stud, and screw it tightly into the nut. Chuck the protruding shank in the machine. Press the disk to be polished tightly against the suction cup so that it will be gripped securely.

Abrasive cloth or paper wrapped around a block and held against the rotating disk quickly polishes it.—*H. J. Gerber, Stillwater, Okla.*



CONTINUED



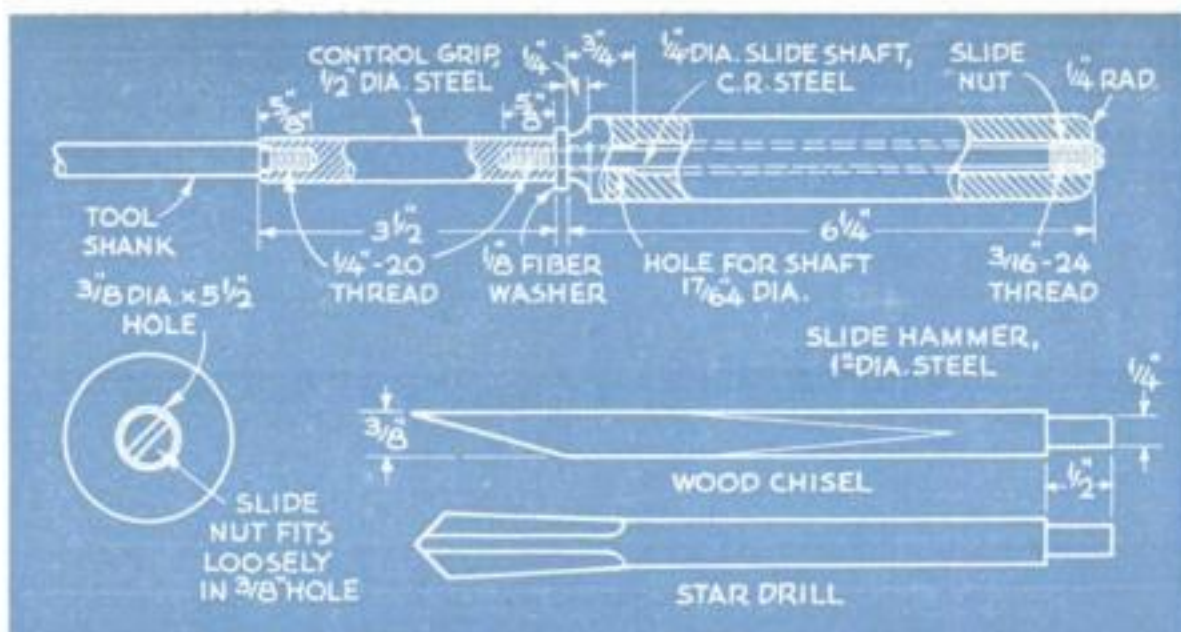


## Slide Hammer Gives Power with Precision

INSPIRED by a familiar shipping-room tool designed for pulling nails from crates, this easily made tool can be used to deliver delicate taps for precise chiseling, or vigorous blows for drilling in concrete.

The sliding hammer head is made captive on the slide shaft by a shouldered guide hole and retaining nut. Make the hole through the hammer head by first drilling all the way through with a  $17/64$ " drill, then reaming from the top end with a  $3/8$ " drill. The rest of the construction is straightforward and apparent from the drawing.

Standard hand tools are adapted for use with the hammer by turning down the shanks on the lathe and threading them to fit the hammer chuck. Some of the more useful are star drills, wood chisels, cold chisels, nail sets, and center punches.—*T. E. Halldorson, Evanston, Ill.*



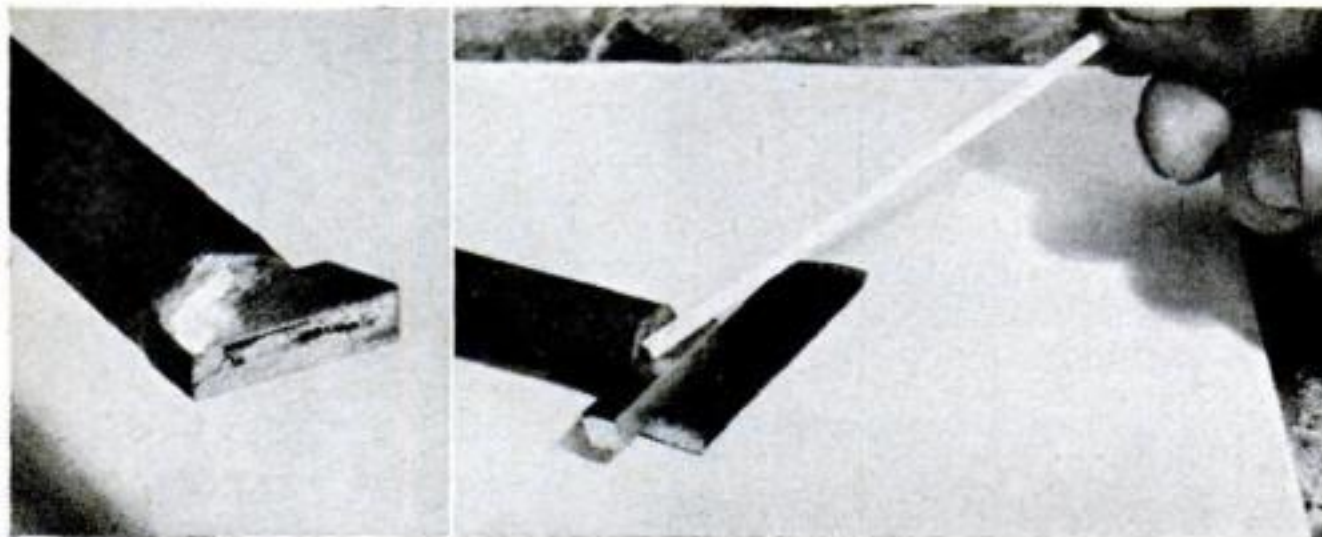
## Short Ends of Lathe Bits Put to Good Use

THROWING away the short ends of high-speed lathe bits has always bothered me. Recently I had occasion to bore some holes too small in diameter for our smallest boring bar. I silver-soldered one of the discarded bits to the end of an Allen wrench, blocked up the improvised boring bar in the regular tool post, and

bored the holes without difficulty. In fact, it worked so well we now use the same idea on our regular round boring bars. They are ideal for boring to a square face, or internal threading to a shoulder. We don't throw away short ends now.

I use a regular, coated, silver-alloy rod and keep a slight excess of acetylene in

the flame. Both surfaces to be joined must be ground bright and clean. Use only enough heat to make the silver "wet" the surfaces to be joined. Allow to cool in the air. Do not quench in water or oil.—*W. C. Cheney, Seattle.*



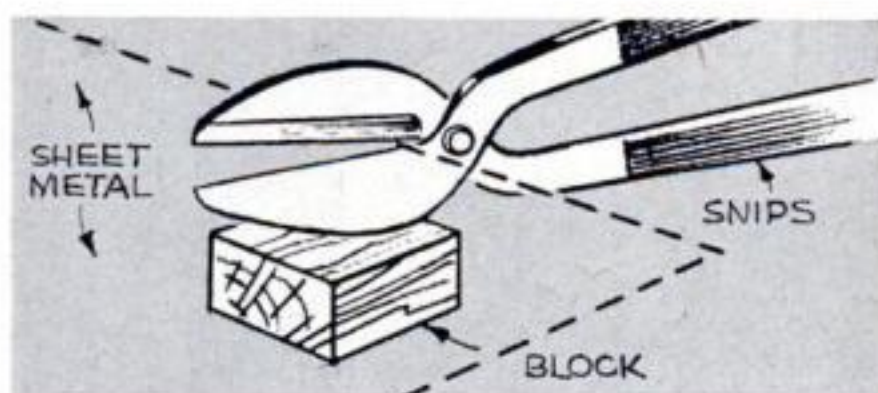




### Holder for Acid Container

KNOCKING over a container of soldering acid can make a nasty mess. To make sure it doesn't happen, I set the container firmly in a coffee can partly filled with sand. For safety, I store my acid bottles on a shelf in the same way.—*A. A. Jagiellowicz, Ansonia, Conn.*

▶▶▶ A COARSE hacksaw blade for bench use can be made from a length of metal-cutting bandsaw blade. Pin holes can be punched or drilled in the ends of a 1/2"-wide blade of six or eight teeth per inch. The blade saves a lot of work in hogging through machine and cold-rolled steel.—*John Henry, Pittsburgh.*

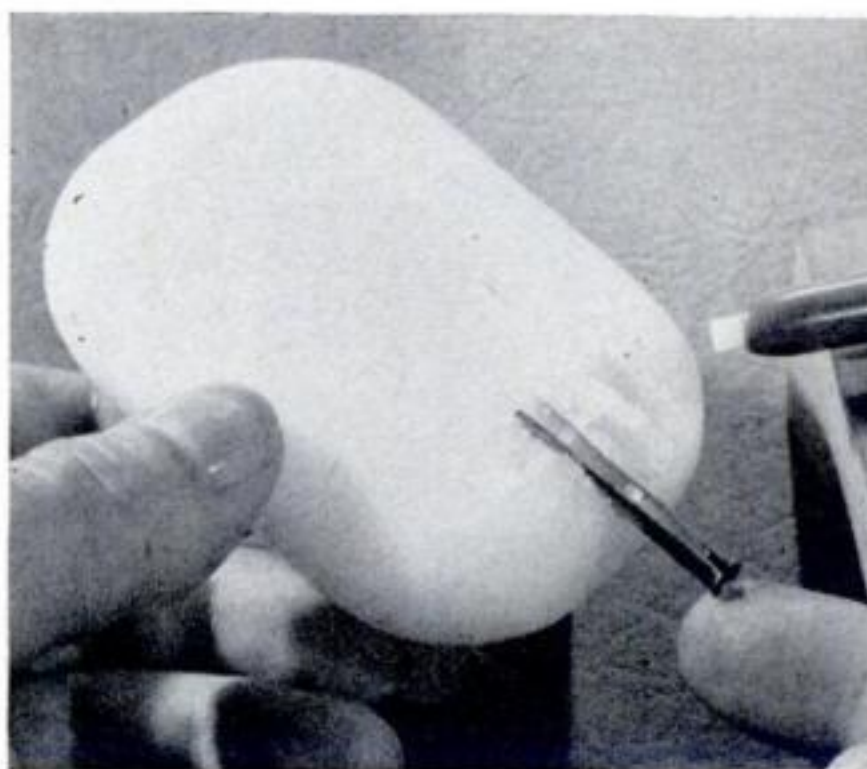


### Aid for Sheet-Metal Cutting

SNIPPING sheet metal up to 16-gauge is easier if the cutting blades of the snips are raised above the bench on a block of wood. It prevents binding, and you can more readily use two hands to apply pressure when you need it on a tough cut.—*Jason Peak, San Francisco.*

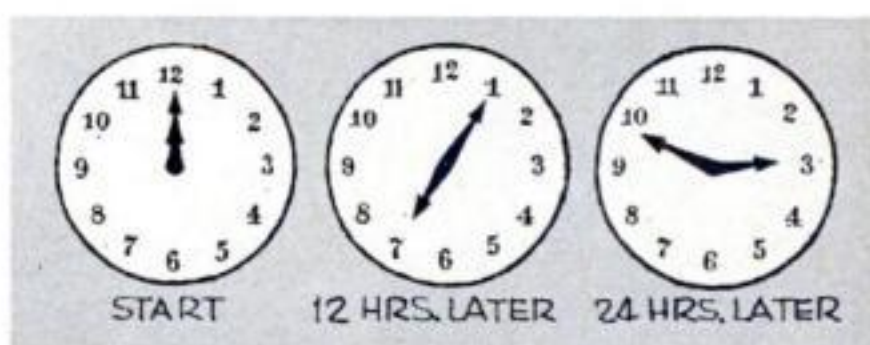
## Short Cuts and Tips

FROM PS READERS



### Soap Used in Grease Pencil

ORDINARY soap works nicely as a temporary refill in a grease pencil. Merely force the empty sleeve into a bar of soap. When you replace the sleeve in the pencil, the soap will be propelled from the end in the same way as a regular filler.—*Martin Kearney, Los Angeles.*



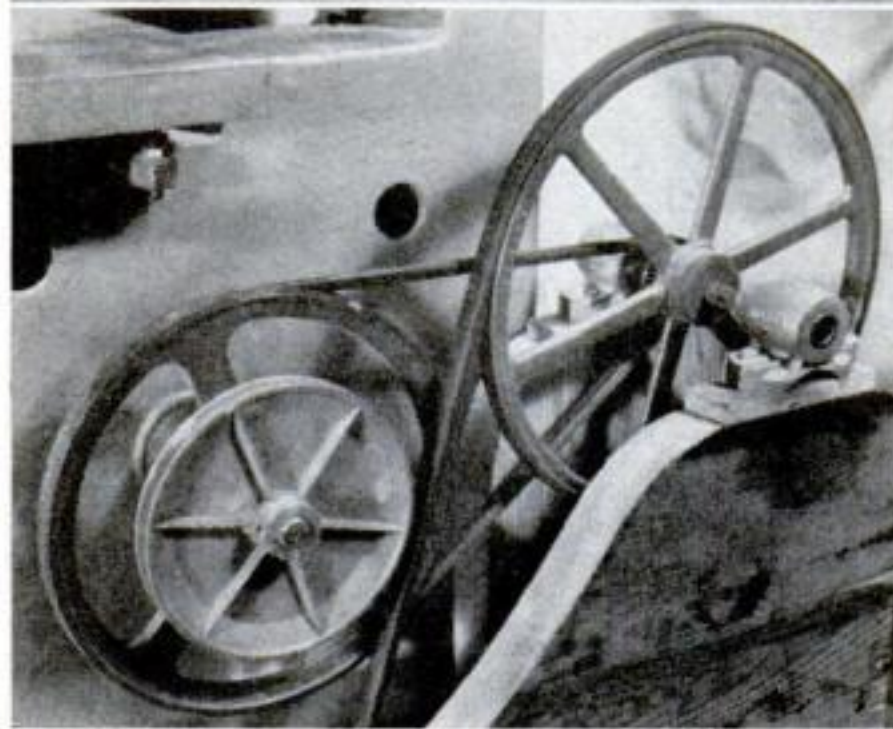
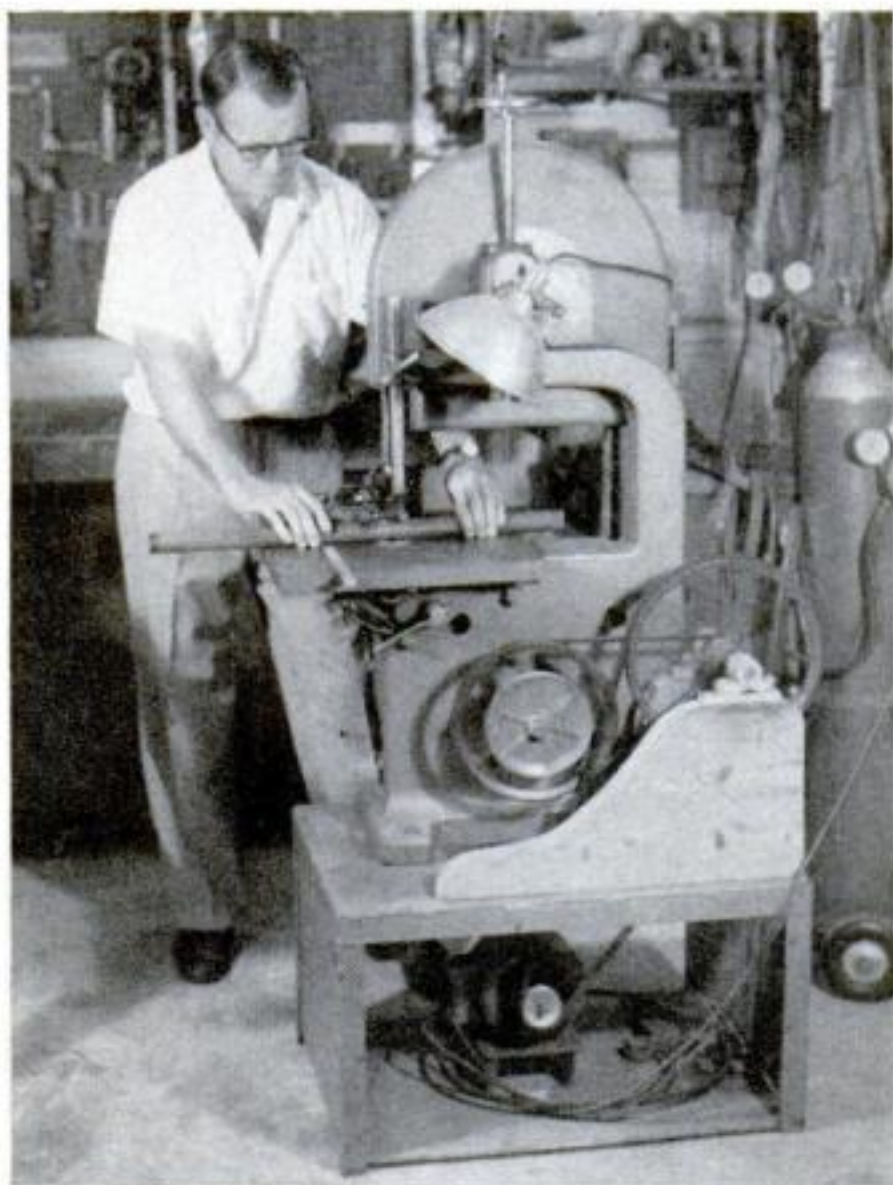
### Timing an Oil Burner

AFTER changing the nozzle tip, I wanted to know how long my oil burner ran during a 24-hour period. I hooked an electric outlet to the motor leads and plugged in a self-starting electric clock. Each time the control system turned on the burner, it also started the clock. When the burner was turned off, the clock stopped. I set the clock for midnight and checked it 12 hours later. It registered 7:05; the burner had run seven hours and five minutes during the night. A full 24 hours after the first setting the clock read 2:48. This told me at a glance that the oil burner had operated 14 hours and 28 minutes during the previous 24 hours.—*C. H. Shedlock, Trenton, N. J.*



# I Cut Metal with My Bandsaw

By Roland Loewen

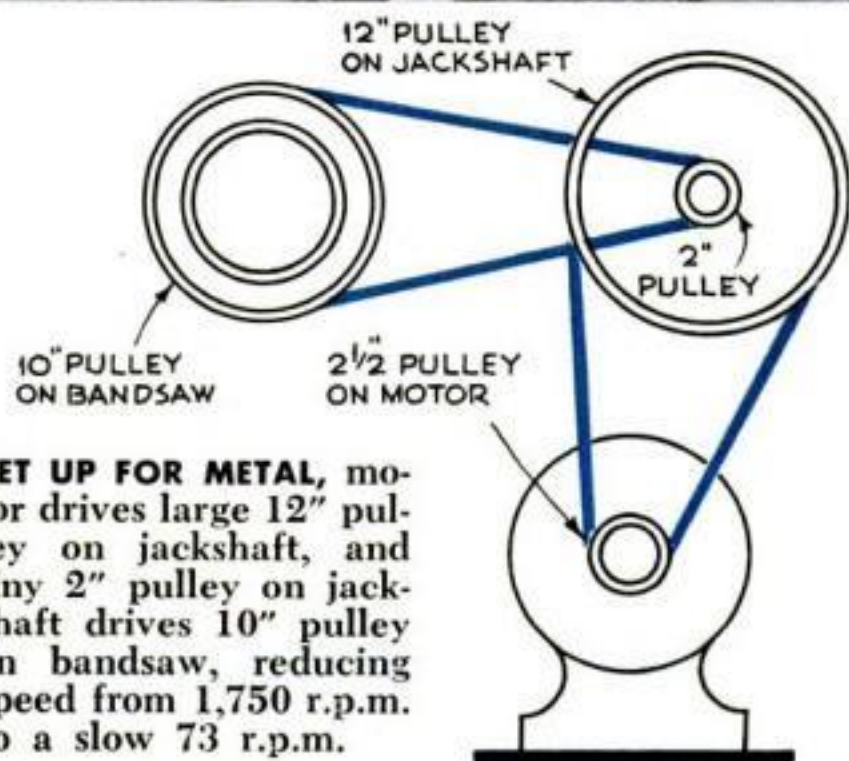


A **HOMEMADE** speed reducer like the one I made will slow down an ordinary bandsaw so you can use a metal-cutting blade.

Without changing either the original motor or bandsaw pulleys, I simply mounted a jackshaft off to one side in pillow-block bearings on wood supports. For metal cutting, you need a blade speed of 280 to 300 feet per minute. On my 15" bandsaw, this meant a final drive speed of about 73 r.p.m.

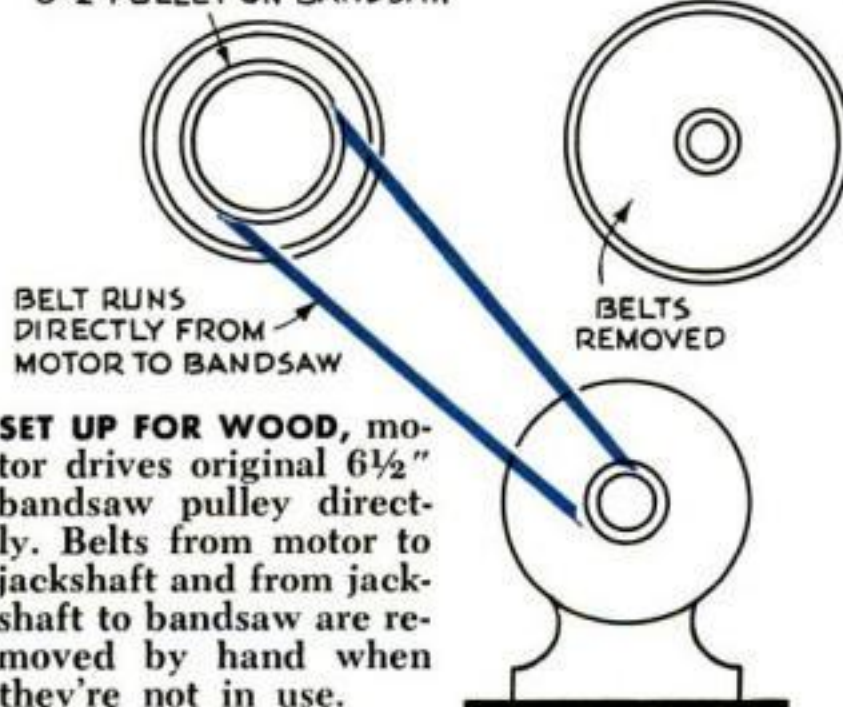
I mounted a 12" pulley—the largest practical diameter—on the jackshaft. With a 2½" motor pulley, this reduced the original 1,750 r.p.m. to about 365 r.p.m. at the jackshaft. I then figured I needed another reduction of about one to five, so I mounted a 2" pulley on the jackshaft, and a 10" pulley on the bandsaw. The result is very close to the required speed.

The same arrangement can be used for a 12" bandsaw except that the 12" jackshaft pulley should be reduced to 10", giving a final speed of about 90 r.p.m. When the saw is used for wood cutting, I belt the motor directly to the original 6½" pulley on the bandsaw, removing the belts to the jackshaft. Belt-tightening adjustments are made by moving the jackshaft bearings back and forth in their slotted mounting holes and inserting wood shims under the bearings.



**SET UP FOR METAL,** motor drives large 12" pulley on jackshaft, and tiny 2" pulley on jackshaft drives 10" pulley on bandsaw, reducing speed from 1,750 r.p.m. to a slow 73 r.p.m.

6½" PULLEY ON BANDSAW

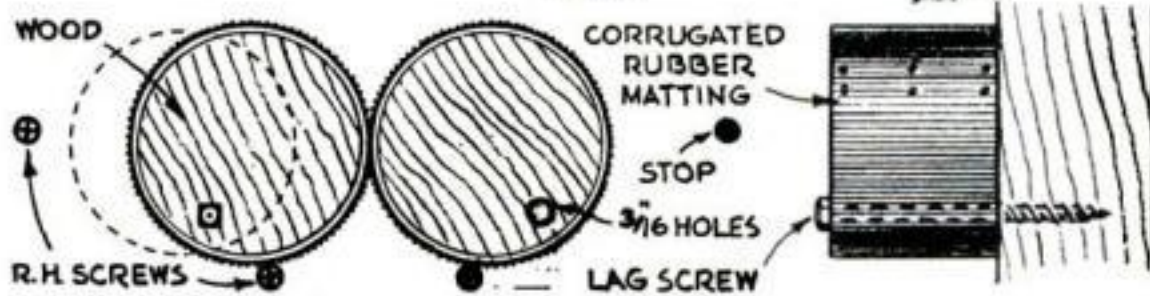
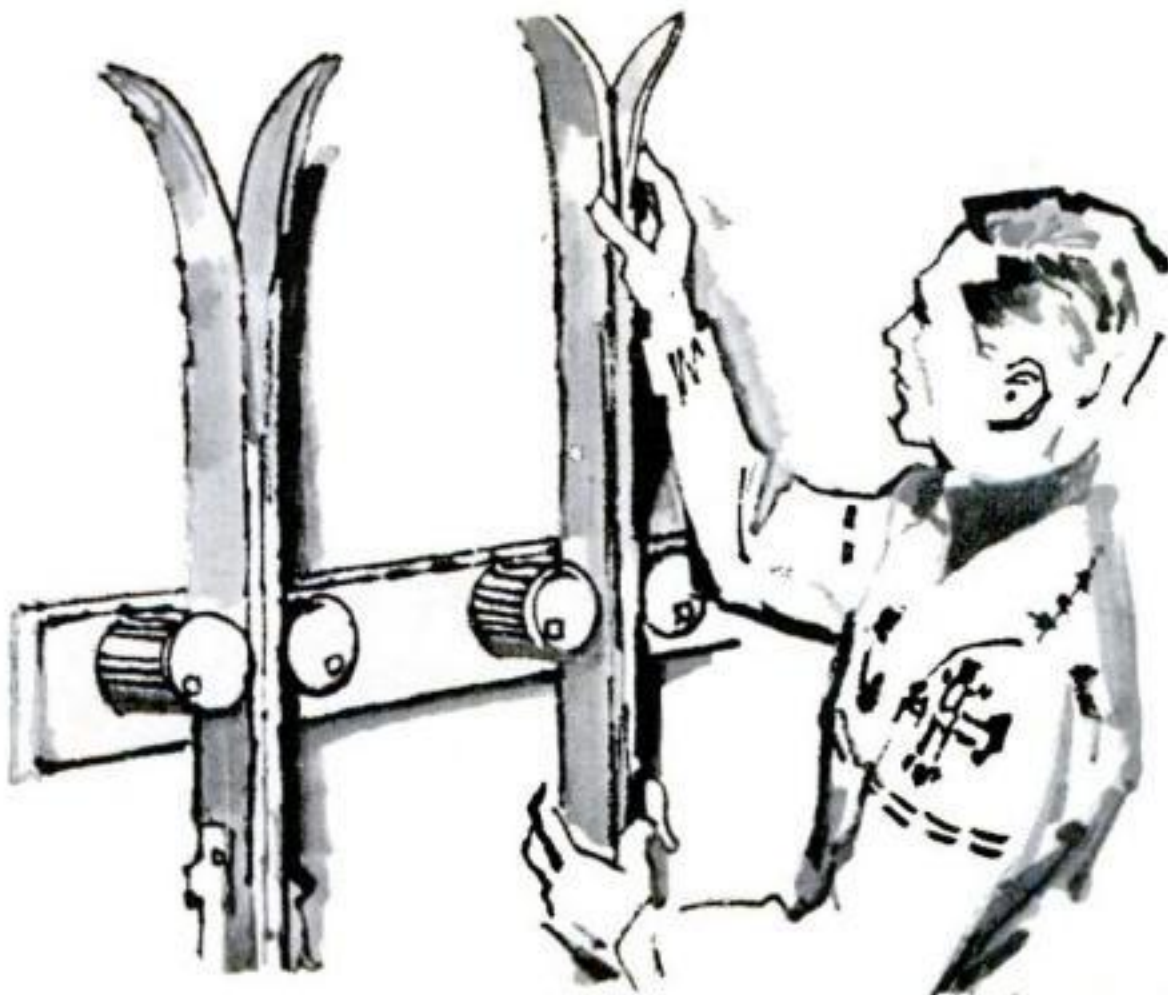


**SET UP FOR WOOD,** motor drives original 6½" bandsaw pulley directly. Belts from motor to jackshaft and from jackshaft to bandsaw are removed by hand when they're not in use.



## Short Cuts and Tips

FROM PS READERS

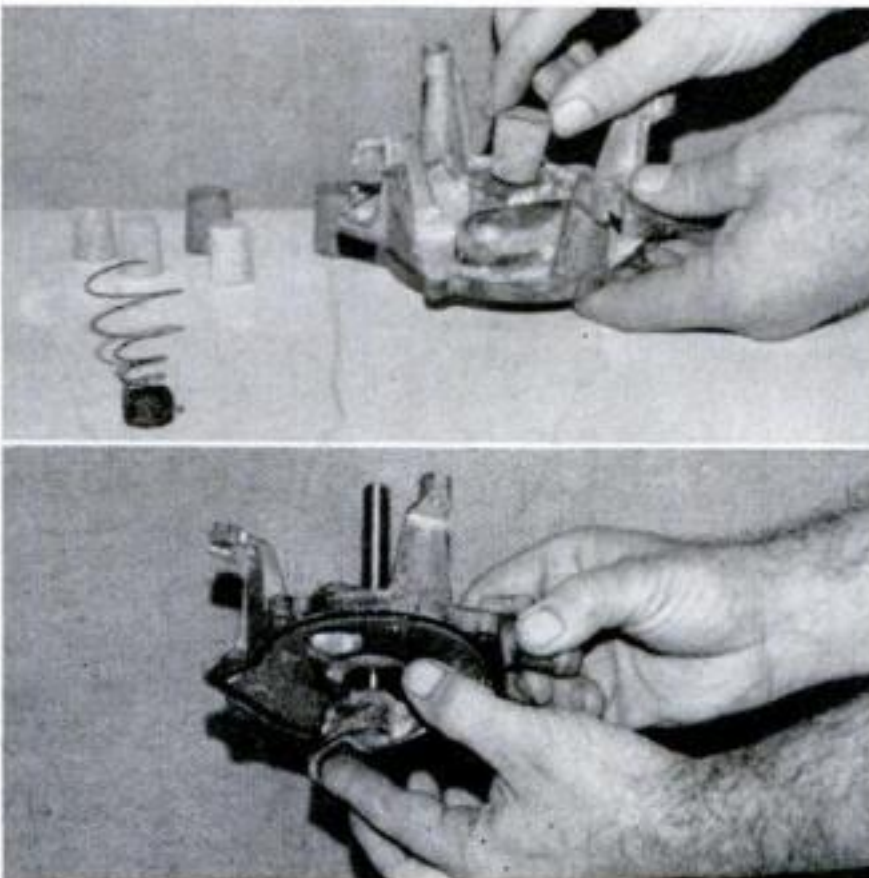


### Easy-to-Make Ski Holder

STORING skis can be awkward. But not with this friction holder. For each set of skis, cover the rims of two pine cylinders,  $3\frac{1}{8}$ " in diameter and 3" long, with corrugated rubber. Mount them with 5" lag screws slightly off center, as shown. Roundhead wood-screw stops prevent the holders from swinging too far in either direction. When the skis are inserted, they'll be gripped firmly.—*Foster R. Freeman, Rocky Mountain National Park, Col.*

### Thin Finger for Bolts

SCREWS or bolts sometimes need placing where there's no room for hands. But a long, thin finger can be rigged to do the job. Slip a loop of string through a piece of tubing. Then put the bolt or screw in the eye of the loop, and pull it tight against the end of the tube. When the bolt is in place, the string can be removed by pulling one end.—*Glen F. Stillwell, Manhattan Beach, Cal.*



### Cork Bushing for Washer Pump

A CORK—the kind that stoppers bottles—makes a superior packing for washing-machine pumps. Usually these pumps have a graphite-asbestos packing. Trouble comes when the spring squeezing the packing rusts and loses its muscle.

Select a cork that isn't pitted, dead, or crumbling. It should be as long as packing and spring combined. Drill it lengthwise,  $\frac{1}{32}$ " to  $\frac{1}{16}$ " less than the diameter of the pump shaft. Then grind the outside to fit the pump.

Soak this bushing in grease. Discard the spring; the cork's resiliency will make up for it. Coat the pump shaft with grease, and reassemble the pump.—*Robert A. Brown, Shelbyville, Tenn.*





### Storing Matches Outdoors

MATCHES for use at the outdoor incinerator can be kept dry and handy regardless of the weather. Place them in a small screw-top jar, the cover of which is fastened to the side of a stake. The jar is easily removed or re-screwed to its anchored lid.—*G. E. Hendrickson, Argyle, Wis.*

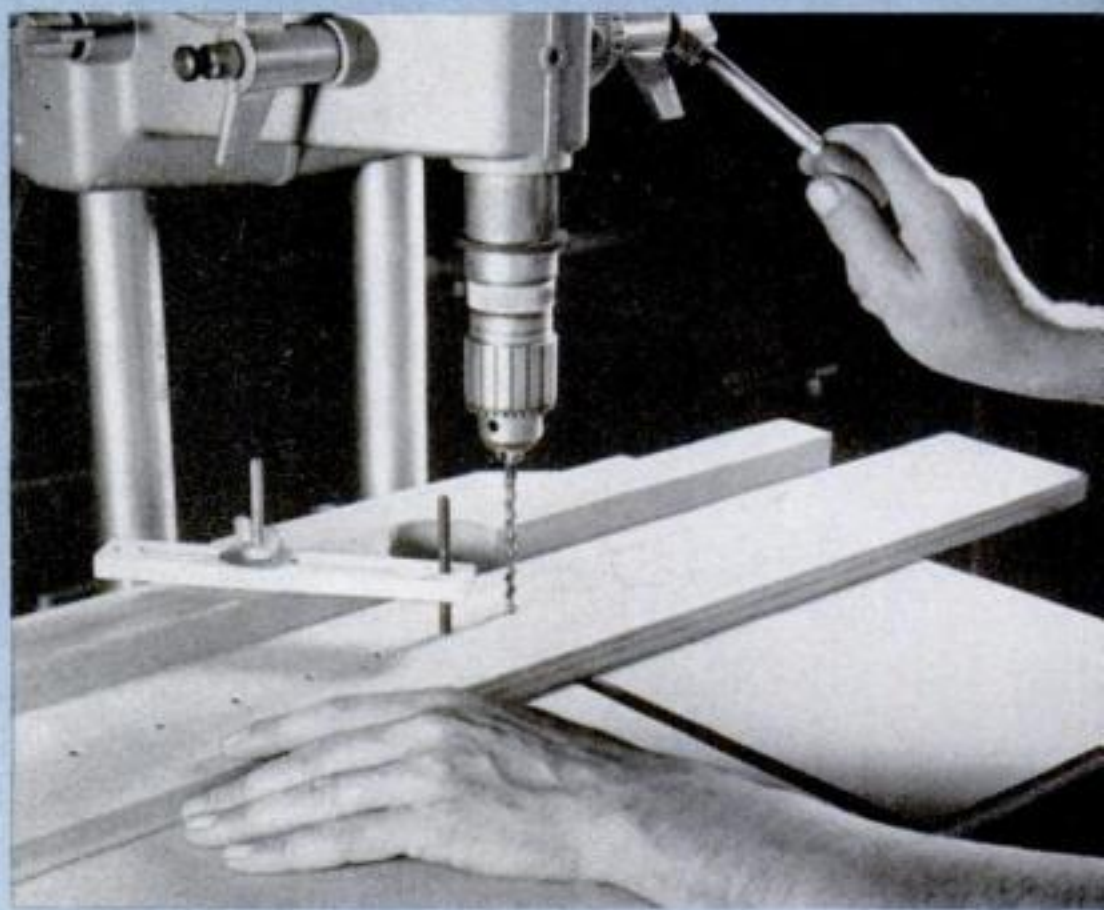
### Plumb Bob from Nail Set



You can make an emergency plumb line from a nail set and a slip-on pencil eraser like that shown in the sketch at the left. Punch a hole in the eraser and thread through it a line with a knot at one end to keep it from pulling out. Then slip the eraser over the nail set.—*Victor H. Lamoy, Upper Jay, N. Y.*

▶▶▶ LOCATE a drawer knob or pull about  $\frac{1}{2}$ " above the center of the drawer face. The knob will then appear centered to the eye that is looking down on it.

The jobs you can do



**AUTOMATIC HOLE SPACING:** There's no guess-work with this adjustable pin guide. As each hole is drilled, work is slid along fence until pin drops into it, exactly locating the next hole.

## How to make a Jig-of-All-Jobs for a Drill Press

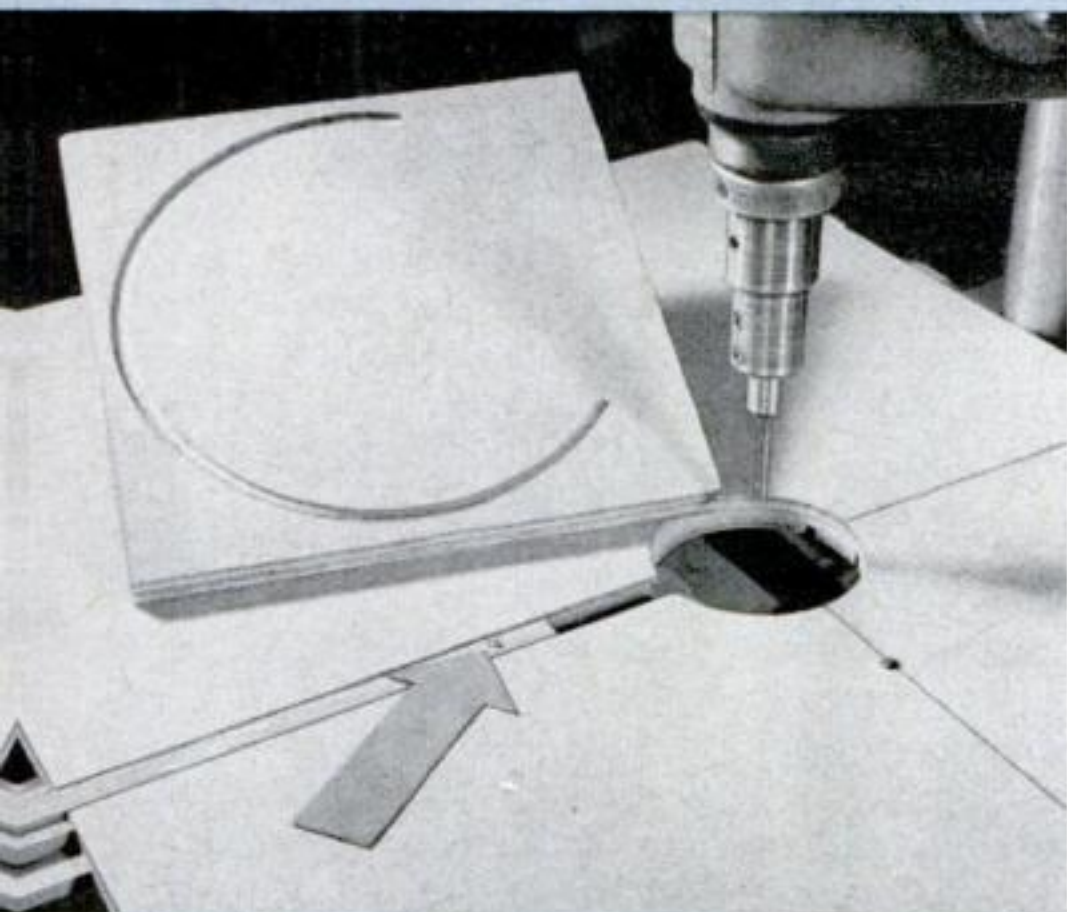
By R. J. De Cristoforo

IMAGINE a single jig for your drill press that combines in one handy form the best of all the special fixtures and accessories that let you do jobs otherwise impossible. Imagine shaping, routing, sanding, circle-cutting, drilling odd-shaped objects, and many other tasks—all performed on one table that need not be moved.

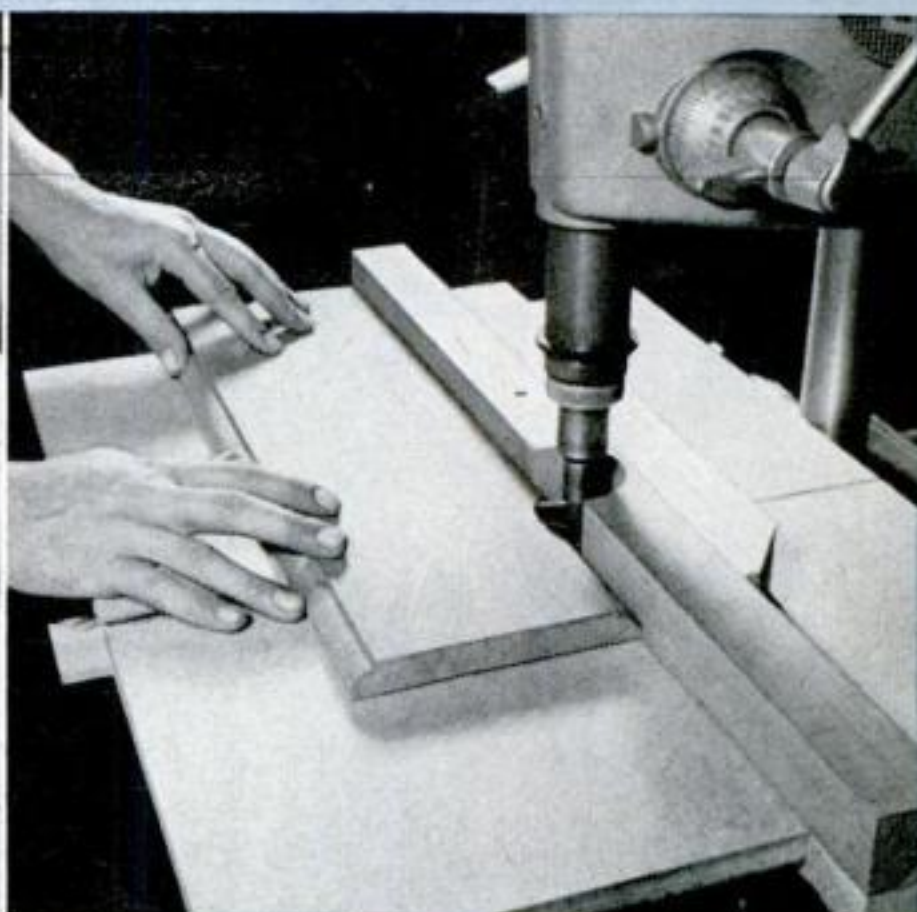
You can't buy such a jig anywhere, but you can make one over a weekend for three or four dollars. It saves fussing with a closetful of separate jigs that must be attached one at a time for each job. It speeds your work and makes it more accurate. What's more, it turns



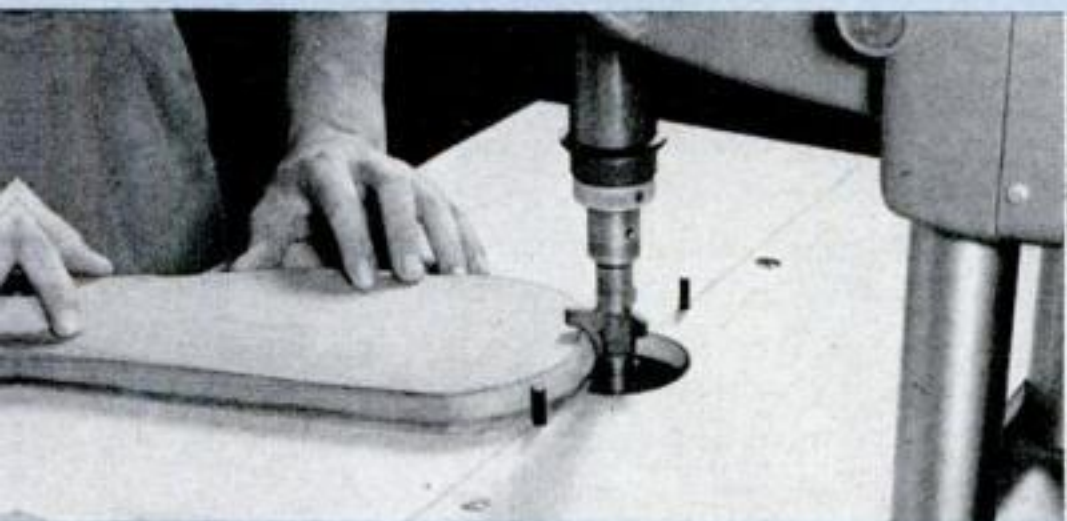
*with the drill-press jig-of-all-jobs*



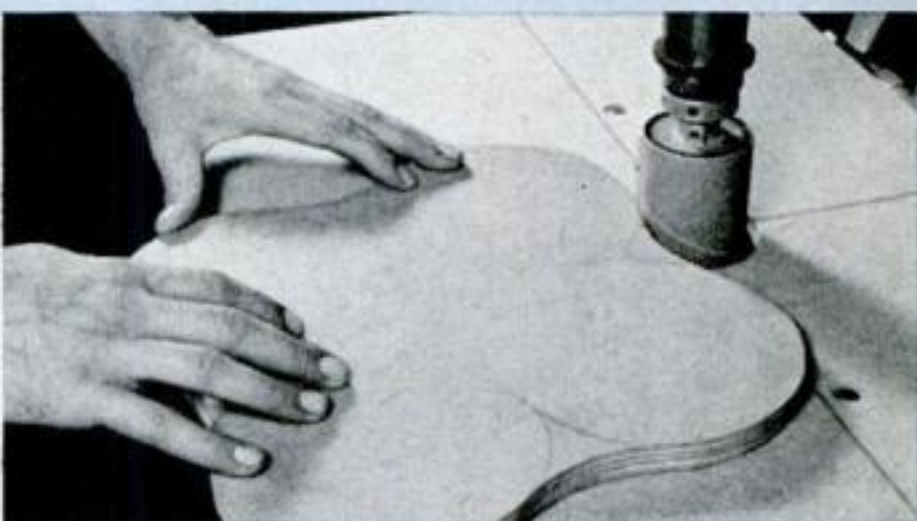
**CIRCULAR ROUTING:** Sliding pivot (arrow)—another built-in jig—makes perfect circles of any diameter. For large holes or disks, cut is made in easy stages right through work.



**STRAIGHT SHAPING:** Just slide the adjustable fence forward and you can accurately control cuts to any depth. If entire edge is removed, support work with shim after it passes cutters.



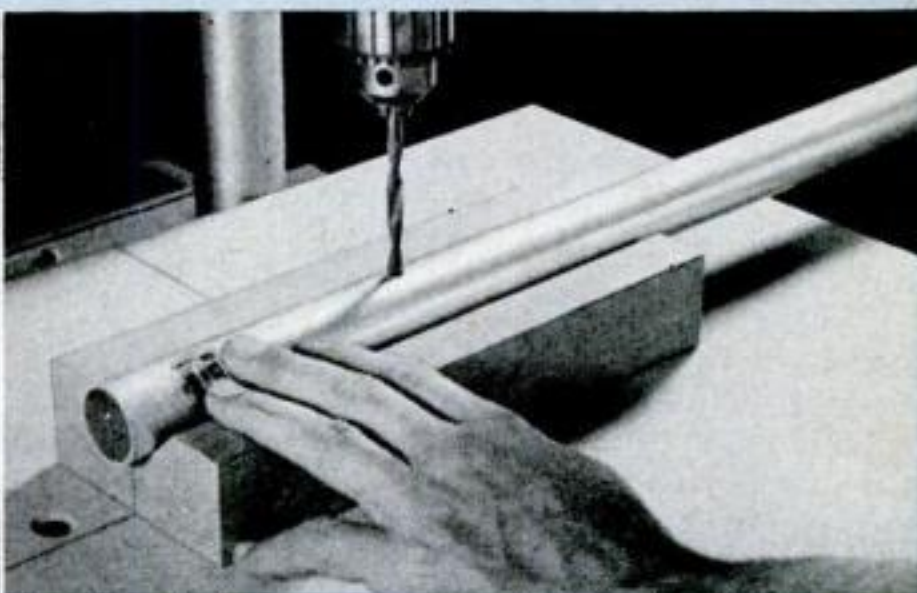
**FREEHAND SHAPING:** Irregular edges are shaped against these two removable pins that brace work as you feed it slowly into the cutters. Depth of the cut is controlled by the shaper collars.



**FREEHAND SANDING:** Hole in table permits drum sander to drop right through to any depth. If iron table below won't let drum pass through, block up work to reach upper half of sander.



**PATTERN SANDING:** Disk dropped into hole in table is same size as sander. Pattern to be copied (lower piece at left) bears against the disk until the upper piece exactly matches it.

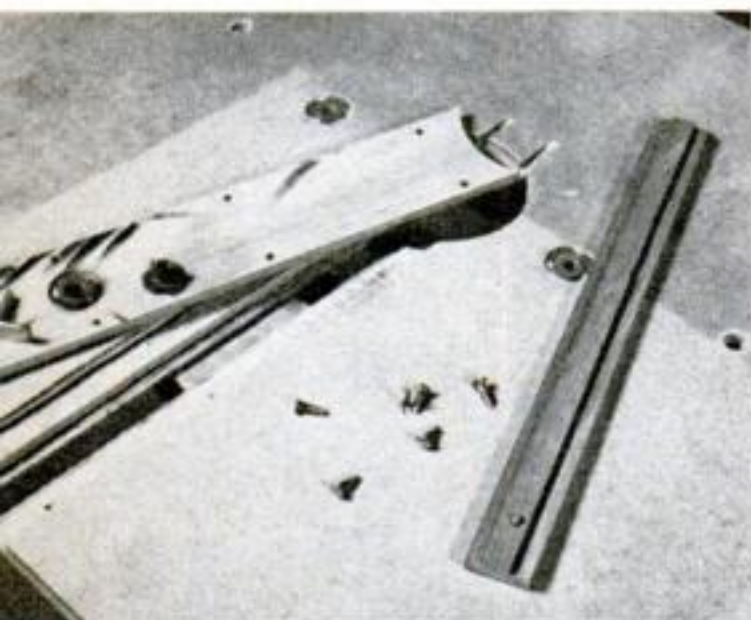


**DRILLING ROUND STOCK:** V block slips quickly over two locating pins, automatically lining it up so that tubes and cylinders, regardless of size, are exactly centered under the drill.

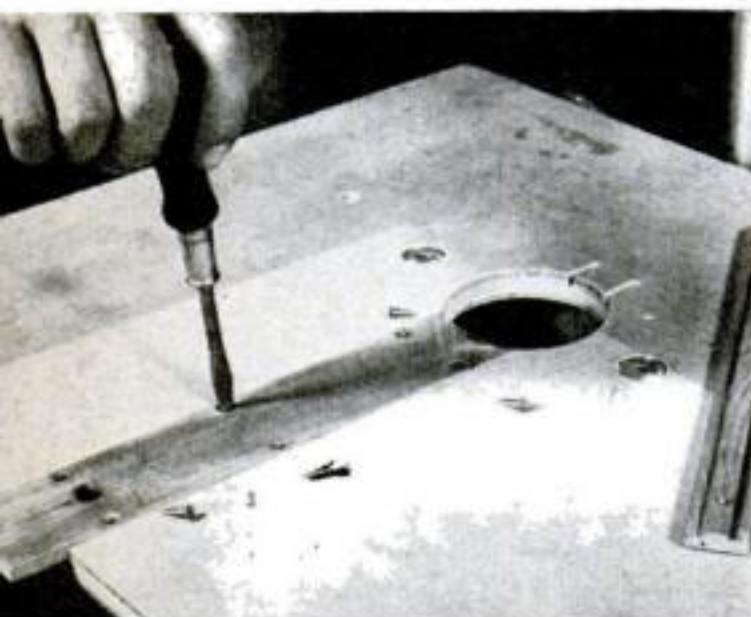




**ATTACH NEW TABLE** to metal one by means of existing holes. For a precise fit where no threaded holes exist, drill and tap new holes.

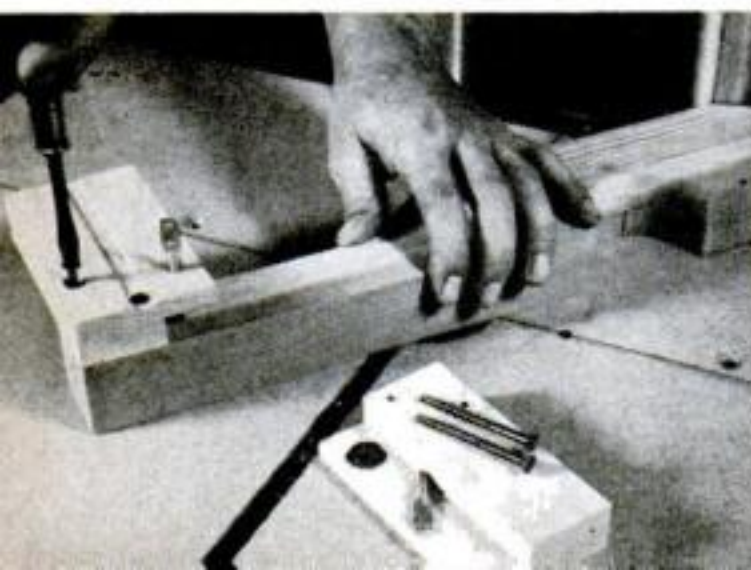


**UNDERSIDE OF TABLE** shows rabbeted grooves for pivot slide and flat strip that holds slide in. Note T nut used to hold lock screw.



**MAPLE STRIP** is screwed to bottom of table to hold slide in place. Use six  $\frac{1}{2}$ " countersunk screws. Curve end of strip to match the hole.

**SLIDING BASES** are glued and screwed to fence. T nuts on inside of rabbeted lips hold bolts that lock the fence into position.



your drill press—essentially a metalworking machine—into a versatile woodworking tool.

**What the table does.** It provides a good-size platform for your work—a big help no matter what the job. For drilling, the adjustable lock-on fence accurately positions work for correct edge distance.

Where you need a lot of equally spaced holes, the overhead pin guide automatically spaces the holes for you. Unlike conventional fixed guides, this one is adjustable to various widths of work and distances between holes.

The fence is also used for straight shaping, routing, veining, surface fluting—in fact, for any operation where you need a straight guide adjustable to work size and spindle center.

**Special sanding jobs.** The center hole in the table lets you drum-sand irregular edges. To sand straight boards to exact width, you run them between drum and fence, removing small amounts in successive passes.

Drop the special double-decker disk into the hole and you can do pattern sanding with the drum, a wonderful technique that easily makes exact duplicates of irregular shapes. Insert a similar disk but with a center pin in place of the upper disk and you can drill holes twice as deep as the maximum spindle stroke. You drill the work halfway through from one end, then flip it over on the pin and drill the other end. The two holes will line up exactly.

Two removable pins in the table serve as guides against which you do freehand shaping of irregular or curved edges. Tricky drilling of round stock is made easy by a V block that drops quickly over the same two pins.

The ingenious pivot slide lets you do many jobs not usually possible on other tools. By rotating the work on the spindle, you can sand circles to exact size, rout circular grooves, shape curved edges, or cut circles or holes too large for other equipment.

**Tips on construction.** It can't be a haphazard job. Work slowly and carefully. Use a good grade of plywood for the platform. Hardboard-faced plywood was used on the one shown because of its smooth surface and durability. Maple or birch would be a good bet for the other parts.

Although the table shown here is mounted on a multipurpose tool, its basic design suits any drill press. Only the method of attachment may differ. On a multipurpose tool, the table can be screwed into the holes for the regular table insert. On a conventional drill press, use the method suggested in the drawing.

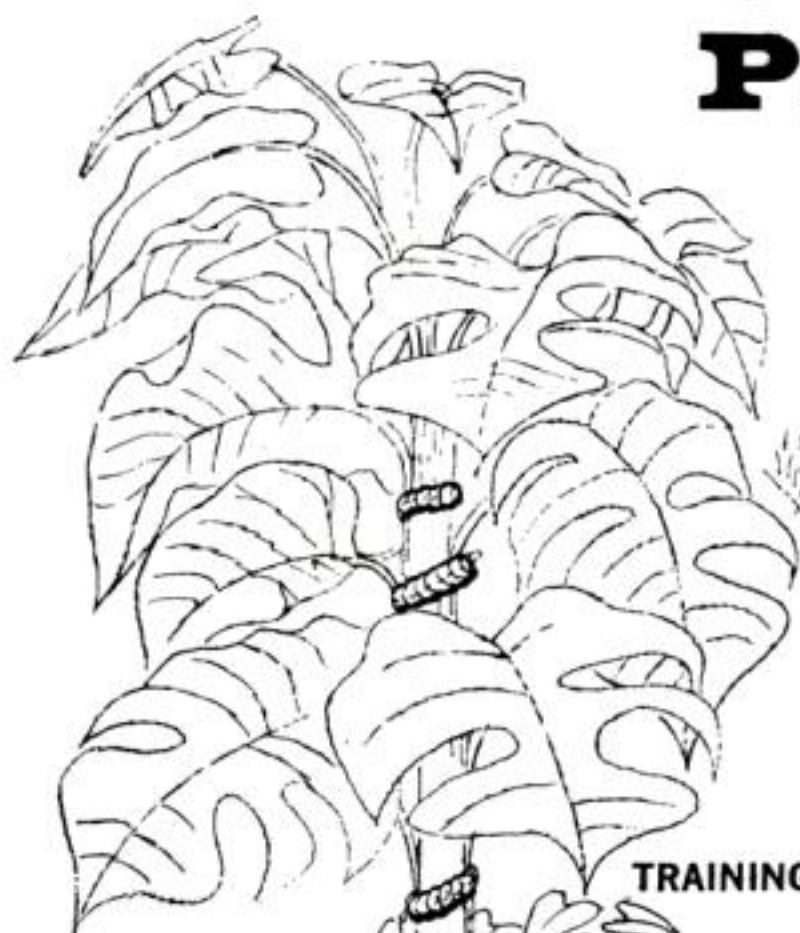
**Laying out the jig.** Once the table is locked in place, lower the quill with a small drill to make a fine hole. Through this hole draw two lines at right angles to each other, one from side to side and the other from front to back. These lines and the hole form the



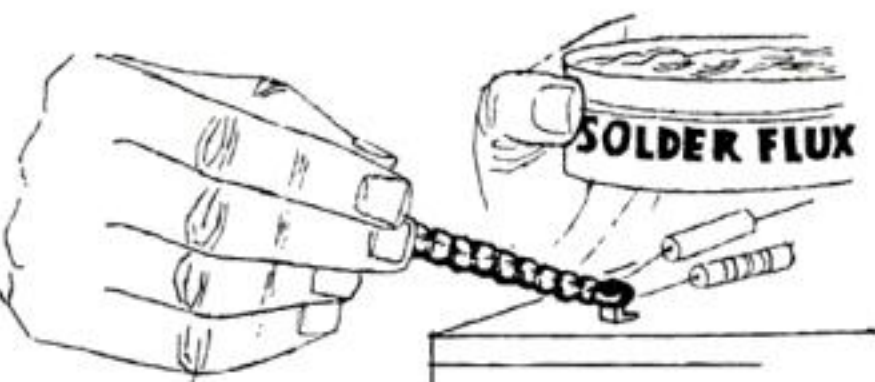




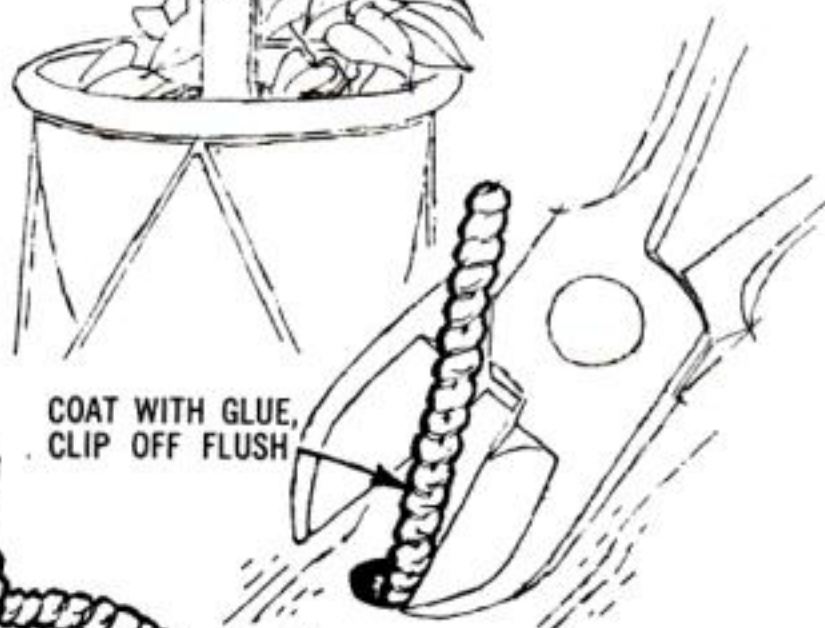
# 7 Uses for Pipe Cleaners



TRAINING PLANTS



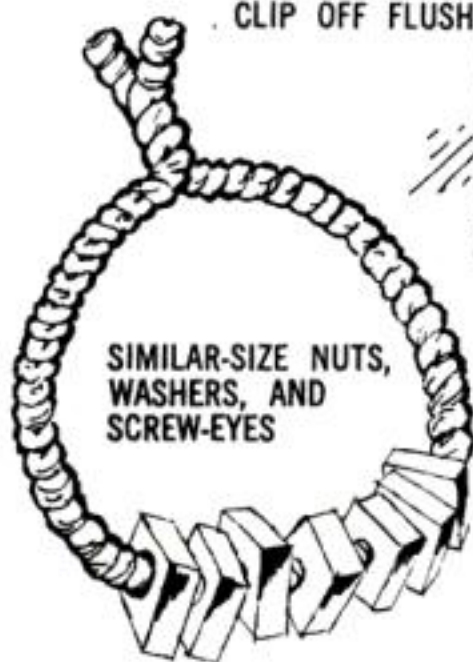
APPLYING FLUX OR SOLDERING COMPOUND



NEW GRIPS FOR WOOD SCREWS

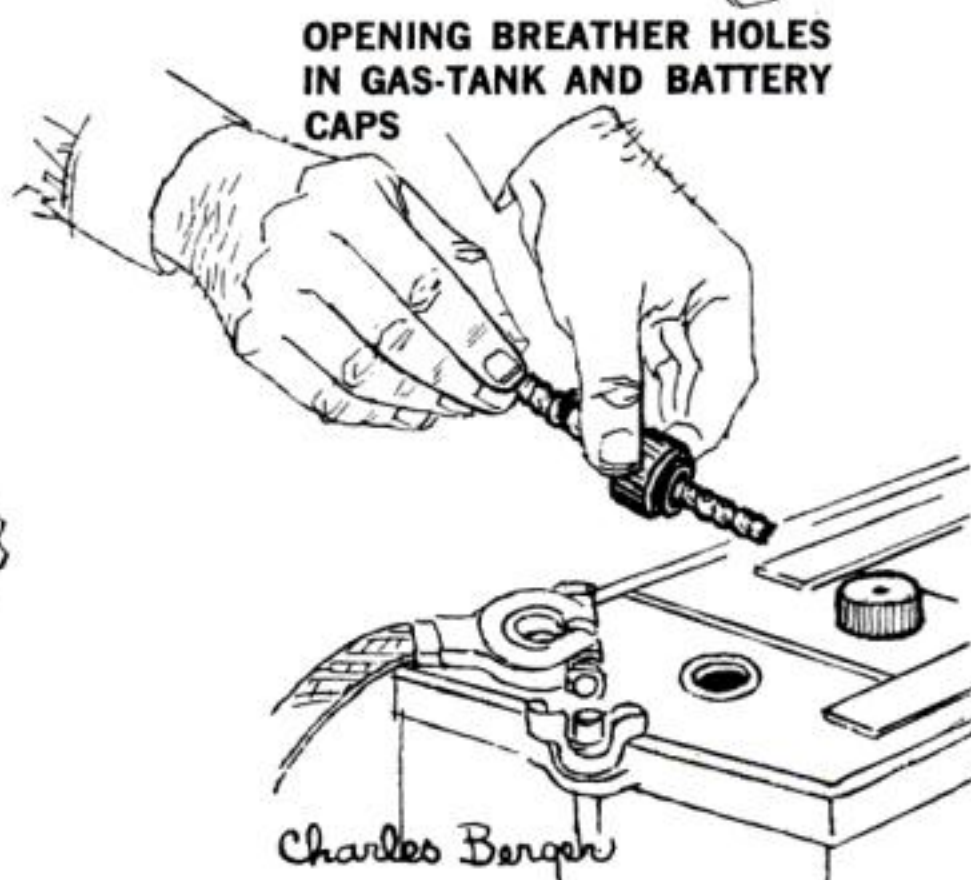


LUBRICATING LOCKS

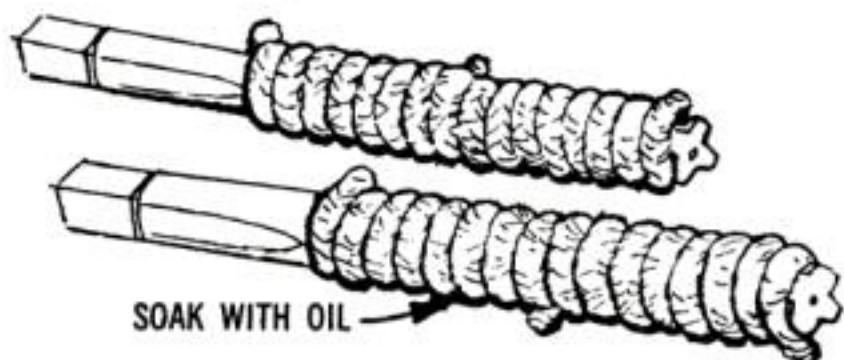


SIMILAR-SIZE NUTS, WASHERS, AND SCREW-EYES

SORTING SMALL PARTS



OPENING BREATHER HOLES IN GAS-TANK AND BATTERY CAPS

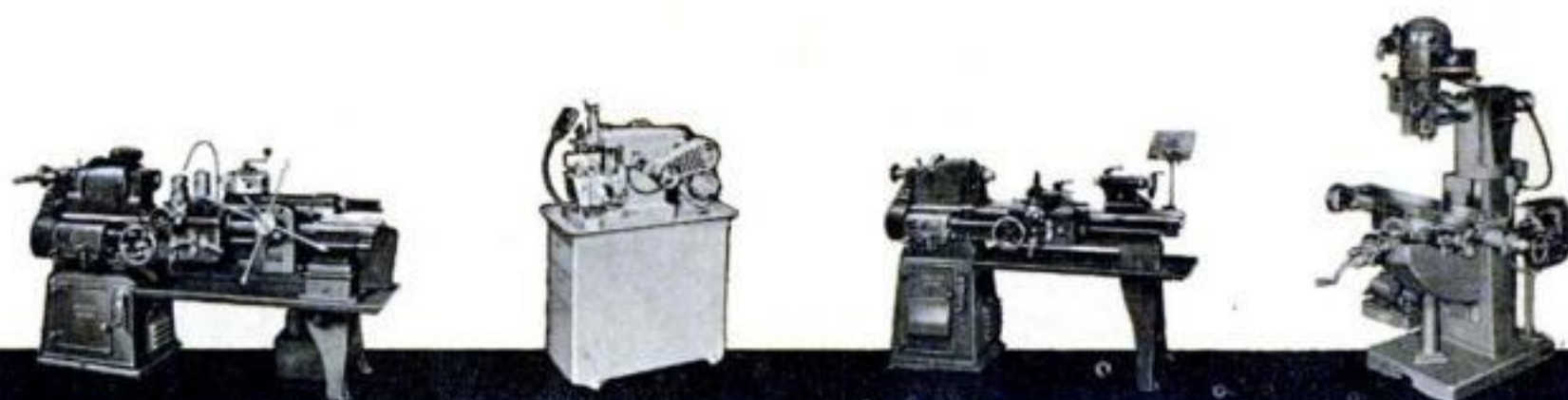


PROTECTING THREADS ON TAPS

Charles Berger

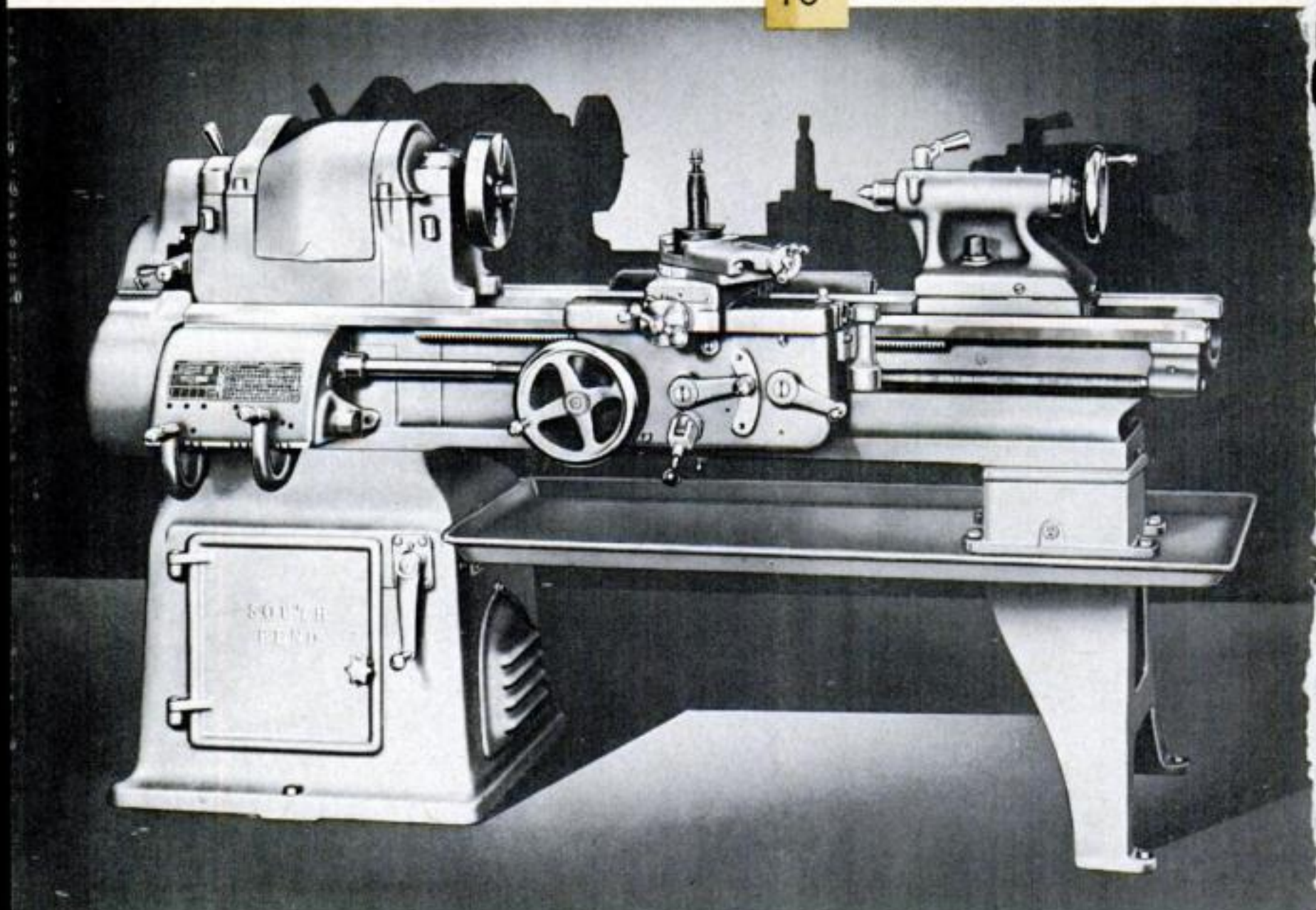


# *Machine Tools*



**FOR EFFICIENT • ACCURATE • DEPENDABLE MACHINING**





### Performance-packed Precision Lathes

For over a half-century South Bend Lathes have built a reputation for dependable, efficient machining. You'll find them everywhere—in factories, toolrooms, experimental shops, laboratories, maintenance and service shops around the world—everywhere that metal has to be turned accurately, smoothly and economically.

Here are a few of the things that contribute to the efficient, dependable performance of South Bend Lathes:

**SMOOTH POWER.** Smooth vibration-free power, so essential for precision operations, is made possible by the direct belt drive to the spindle. The high efficiency of this drive delivers more usable power. Back gears provide low speeds for heavy cuts.

**SUPERFINISHED SPINDLE.** Spindle bearing surfaces are hardened, ground and then superfinished to five microinches (.000005") r.m.s. Spindle runs in bronze bearings which are



#### TIME PAYMENT PLAN

3¼% interest on original unpaid balance per year—up to 36 months to pay.



## LATHES

precision bored and burnished to a smoothness of ten microinches (.000010") r.m.s. No other type of bearing can match this for producing accurate work and fine finishes.

**IMPROVED CARRIAGE.** Fast and easy to operate. New lever operated clutch. Tapered gibs on dovetails of both compound rest top and base. Apron is of rigid one-piece double wall construction with gear shafts supported on both ends. Half-nuts are dovetailed in back wall of apron. Automatic interlock prevents simultaneous engagement of power feeds.

**QUICK CHANGE GEAR BOX.** Exclusive double tumbler type that simplifies selection of wide choice of threads or feeds. Rugged construction insures trouble-free operation.

**RIGID LATHE BED.** Heavily made and braced for maximum rigidity to insure accuracy. Headstock, carriage and tailstock aligned by three large V-ways and one flat way. Hardened bed ways for extreme operating conditions optional at small extra cost.

14½" ENGINE LATHE



13" TOOLROOM LATHE



10" ENGINE LATHE



## SPECIFICATIONS and PRICES for 10", 13", 14½", 16" and 16-24" LATHES

## ENGINE LATHES

LATHE SIZE	Catalog Number	Bed*	Swing Over Bed	Between Centers	Collet Capacity Max.	Spindle Speeds †	Cross Feeds	Longitudinal Feeds	Thread Cutting Feeds	Base Price
10"	CL187Y	3'	10⅞"	14"	1-1/16"	12	70	70	70	\$1282
13"	CL145A	4'	13⅞"	16"	1-1/16"	8	48	48	48	1675
14½"	CL185B	5'	14⅞"	24"	1-1/16"	8	48	48	48	2074
16"	CL117C	6'	16¼"	33"	1-1/16"	8	48	48	48	2468
16-24"	CL198C	6'	25⅞"	30"	1-1/16"	8	48	48	48	2795

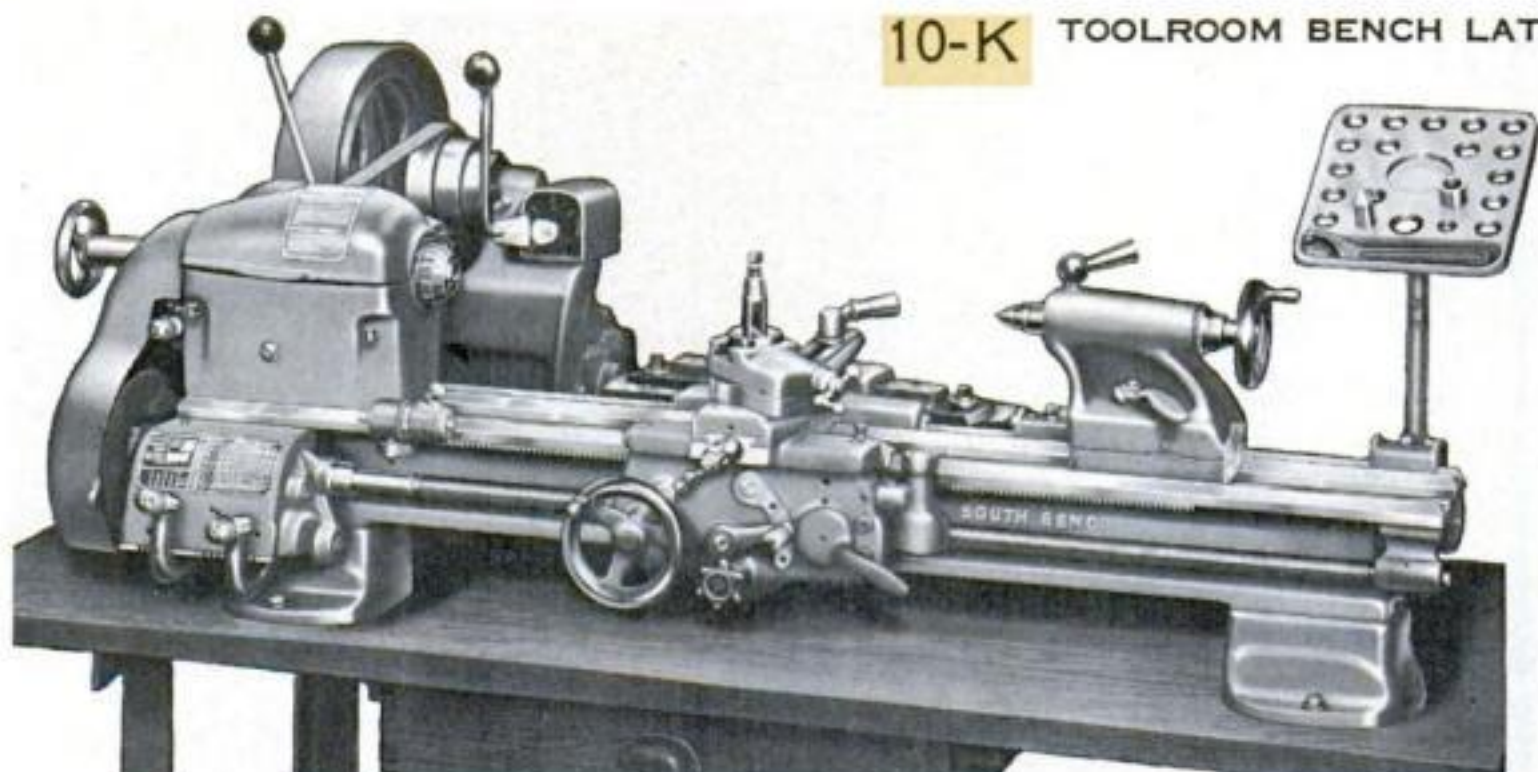
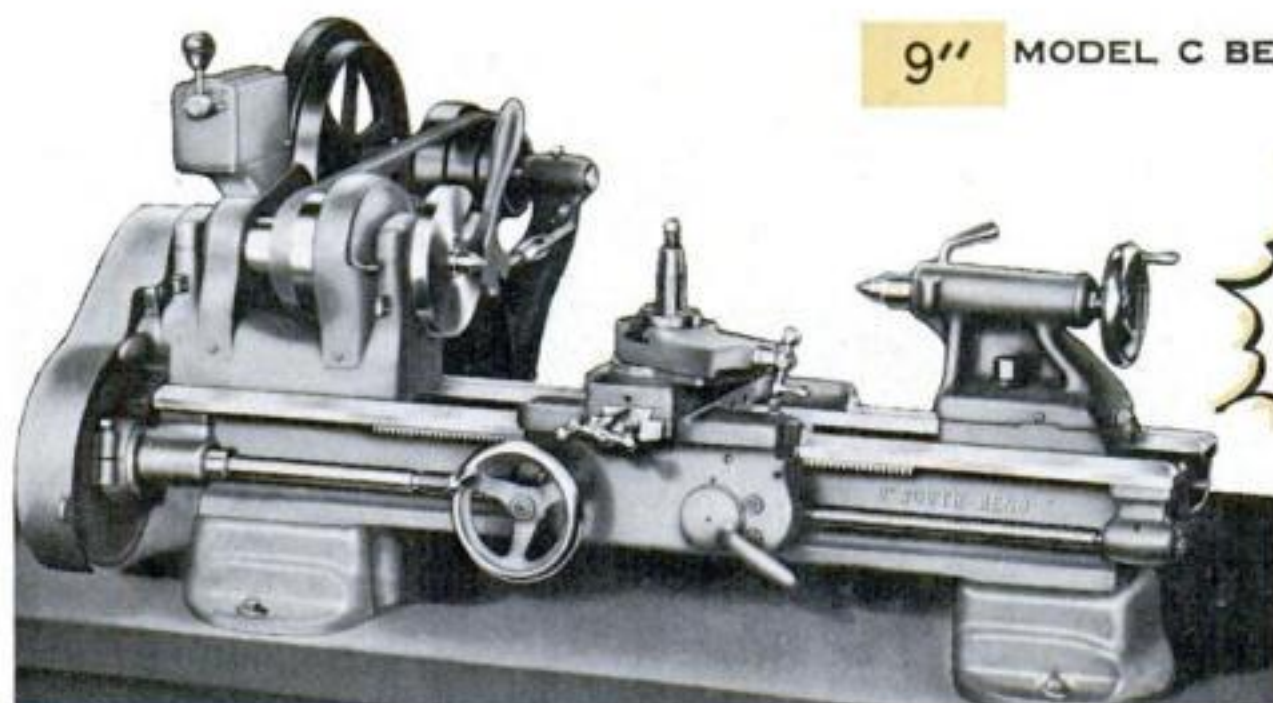
## TOOLROOM LATHES

LATHE SIZE	Catalog Number	Bed*	Swing Over Bed	Between Centers	Collet Capacity Max.	Spindle Speeds †	Cross Feeds	Longitudinal Feeds	Thread Cutting Feeds	Base Price
10"	CL8187Y	3'	10⅞"	14"	1-1/16"	12	70	70	70	1698
13"	CL8145B	5'	13⅞"	28"	1-1/16"	8	48	48	48	2246
14½"	CL8185B	5'	14⅞"	24"	1-1/16"	8	48	48	48	2629
16"	CL8117C	6'	16¼"	33"	1-1/16"	8	48	48	48	3077

\* Minimum bed length shown, other lengths available. Maximum 14' bed on 16" and 16-24" Lathes.

† Number of speeds shown for 4-step cone pulley (except 10" Lathes), 3-step cone pulley at same price. 2-speed motors available.



**BENCH LATHES****10-K** TOOLROOM BENCH LATHE**9"** MODEL C BENCH LATHE

Prices  
start at  
**\$280**

South Bend 9" and 10-K Bench Lathes are precision machines with many of the features of larger lathes. They are extensively used for machining endless types of small work. Their ability to perform efficiently, regardless of the job, has made them popular every place from experimental to

production shops. These lathes are produced in such large quantities that many manufacturing economies have resulted. This makes it possible to offer more accurate and dependable lathes at competitive prices. See facing page for descriptions and prices of various models.



**144 Bench Lathes****to choose from**

The 9" and 10-K Bench Lathes are available in four models: Model A, Model B, Model C and Toolroom. Each of these are made in various bed lengths and with 6-, 8-, 12- and 16-speed drives.

**Model A.** Quick change gear box. Universal apron with worm drive for power cross and longitudinal feeds.

**Model B.** Independent change gears. Universal apron with worm drive for power cross and longitudinal feeds.

**Model C.** Independent change gears. Plain apron with half-nut drive for power longitudinal feeds. Manual cross feeds.

**Toolroom.** Same as Model A with addition of precision lead screw, hand-wheel collet attachment, collet rack, plain taper attachment, thread indicator, thread cutting stop, large face plate and micrometer carriage stop.

**9" AND 10-K GAP BED BENCH LATHES**

These lathes have extra capacity for boring and facing operations. A removable bed insert provides a 5" gap that increases the swing on 9" Lathes to 14 $\frac{1}{8}$ " and on 10-K Lathes to 14 $\frac{7}{8}$ ". With the insert in place, all regular operations can be performed. Made in Models A, B and C; 4 $\frac{1}{2}$ ' beds only.

**9" AND 10-K FLOOR LATHES**

All models of both sizes are made in the Self-Contained Drive type which includes drive equipment, chip pan and floor legs. Also, in Metal Column Base Underneath Motor Drive type (not available in Gap Bed Lathes).

**SPECIFICATIONS and PRICES for 9", 10-K and 10-K Gap Bed BENCH LATHES****BENCH LATHES**

LATHE SIZE	Model	Catalog Number	Bed*	Swing Over Bed	Between Centers	Collet Capacity Max.	Cross Feeds	Longitudinal Feeds	Thread Cutting Feeds	Base Price
9"	A	CL644Y	3'	9 $\frac{1}{4}$ "	16"	$\frac{1}{2}$ "	48	48	48	\$466
9"	B	CL677Y	3'	9 $\frac{1}{4}$ "	16"	$\frac{1}{2}$ "	23	26	45	375
9"	C	CL615Y	3'	9 $\frac{1}{4}$ "	16"	$\frac{1}{2}$ "	man.	14	45	290
10-K	A	CL670Y	3'	10"	16"	$\frac{5}{8}$ "	48	48	48	546
10-K	B	CL667Y	3'	10"	16"	$\frac{5}{8}$ "	23	26	45	463
10-K	C	CL653Y	3'	10"	16"	$\frac{5}{8}$ "	man.	14	45	388

**TOOLROOM BENCH LATHES**

9"		CL8644Y	3'	9 $\frac{1}{4}$ "	16"	$\frac{1}{2}$ "	48	48	48	691
10-K		CL8670Y	3'	10"	16"	$\frac{5}{8}$ "	48	48	48	776

**10-K GAP BED BENCH LATHES**

10-K	A	CL670RG	4 $\frac{1}{2}$ '	10"†	34"	$\frac{5}{8}$ "	48	48	48	663
10-K	B	CL667RG	4 $\frac{1}{2}$ '	10"†	34"	$\frac{5}{8}$ "	23	26	45	580
10-K	C	CL653RG	4 $\frac{1}{2}$ '	10"†	34"	$\frac{5}{8}$ "	man.	14	45	505

\* Minimum bed lengths shown, other lengths available.

All available with 6, 8, 12 or 16 spindle speeds, only 12-speed drive listed above.

† 14 $\frac{7}{8}$ " swing in gap.



10", 13" and 2-H

## TURRET LATHES

### Precision Turret Lathes for Exacting Work

Exceptionally adaptable turret lathes especially suited for small precision parts and critical second operations. They are capable of working to very close tolerances and smooth finishes without sacrificing productivity. Wide ranges of speeds, carriage feeds and turret feeds produce maximum efficiency on any type of job. Turrets will index within  $\pm .0005"$  at 4" from the turret face.

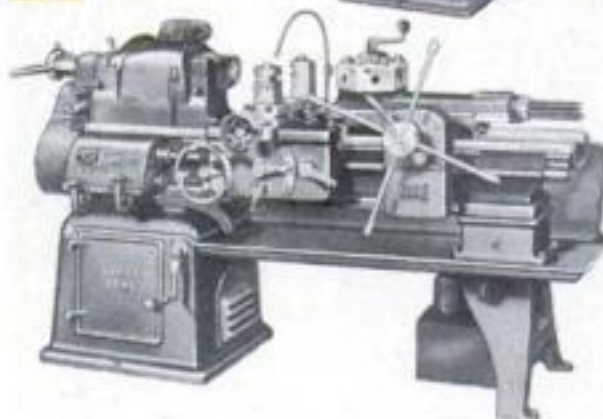


10" TURRET LATHE



13" TURRET LATHE

2-H TURRET LATHE



SPECIFICATIONS and PRICES for 10", 13" and 2-H TURRET LATHES

LATHE SIZE	Catalog Number	Swing Over Bed	Spindle to Turret*	Spindle Speeds	Cross Feeds	Longitudinal Feeds	Thread Cutting Feeds	Turret Feeds	Base Price
10"	CL1006Z	10 $\frac{1}{8}"$	19 $\frac{3}{8}"$	12	70	70	70	man.	\$1748
13"	CL18T	13 $\frac{1}{8}"$	23 $\frac{5}{8}"$	6	48	48	48	144	2560
2-H	CL2CT	16 $\frac{1}{4}"$	28 $\frac{1}{4}"$	6	48	48	48	96	3658

\*Maximum for 3 $\frac{1}{2}'$ , 5' and 6' beds respectively.

Spindle bore 1 $\frac{3}{8}"$ , maximum handle lever collet capacity 1-1/16" on all sizes.

## SOUTH BEND

Pedestal

## GRINDERS

### Knuckle Room to Spare

Greater work clearance makes grinding easier and faster on this machine. The mounting of the motor within the pedestal eliminates most vibrations, takes wheel load off motor bearings and protects motor from abrasive dust. 8" or 10" wheels. Pedestal Grinder (8") No. CE2725, less motor .....\$282



#### TIME PAYMENT PLAN

3 $\frac{3}{4}$ % interest  
on original un-  
paid balance  
per year—up  
to 36 months  
to pay.





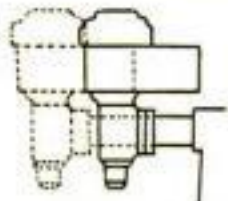
## More Milling for Less Cost

The South Bend Vertical Spindle Milling Machine brings efficiency and ease of operation to a wide variety of toolroom and production work.

Its universal type head is mounted on a large flange on the end of the overarm and swivels through 360° for milling, drilling, boring and reaming at any angle. The overarm has a large key with adjustable tapered gib which eliminates any possibility of play; a rack and pinion adjustment positions the head horizontally *without changing its angular alignment*.

Spindle brake is standard equipment. Power Table Feed and Hydraulic Power Quill Feed are optional at extra cost.

### Only South Bend Offers These 3 Overarm Features



Head rotates 360°, overarm does not turn.

Horizontal head travel without angular resetting.

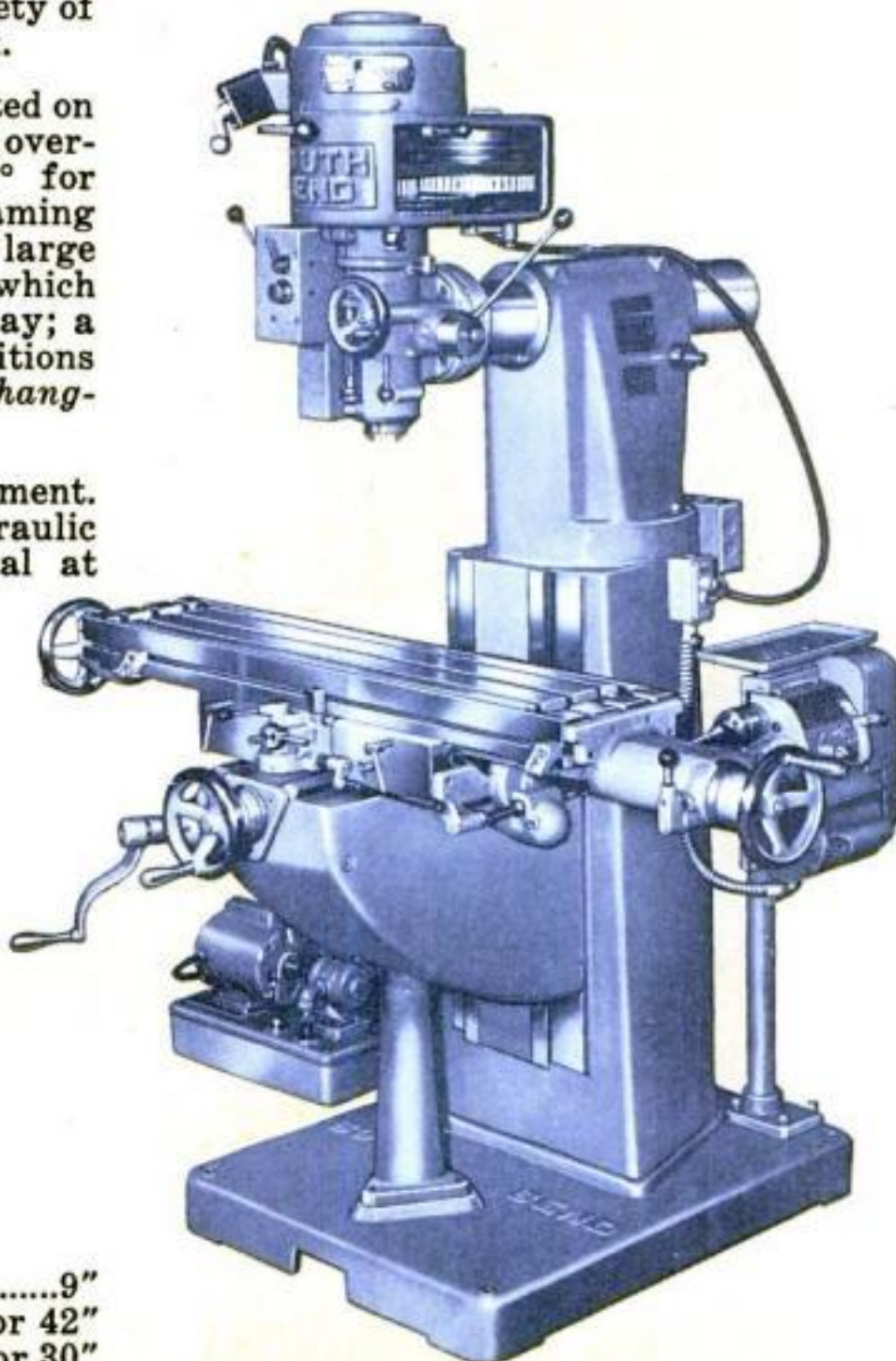


Adjustable tapered gib in keyway prevents play. More bearing surface.



### SPECIFICATIONS

Table width .....	9"
Table lengths .....	32" or 42"
Table travel, longitudinal .....	20" or 30"
Table travel, cross .....	9½"
Table travel, vertical .....	18"
Table to spindle, max. ....	20"
Spindle to column, max. ....	20"
Ram travel .....	15"
Head rotates .....	360°
Quill diameter .....	3¼"
Quill travel .....	4"
Collet capacity, max. ....	¾"
Spindle speeds .....	8



### PRICES

Catalog Number	Table Length	Motor		Price
		R.P.M.	H.P.	
MIL3212	32"	1200	¾	\$1829
MIL3218	32"	1800	1	1829
MIL4212	42"	1200	¾	1911
MIL4218	42"	1800	1	1911

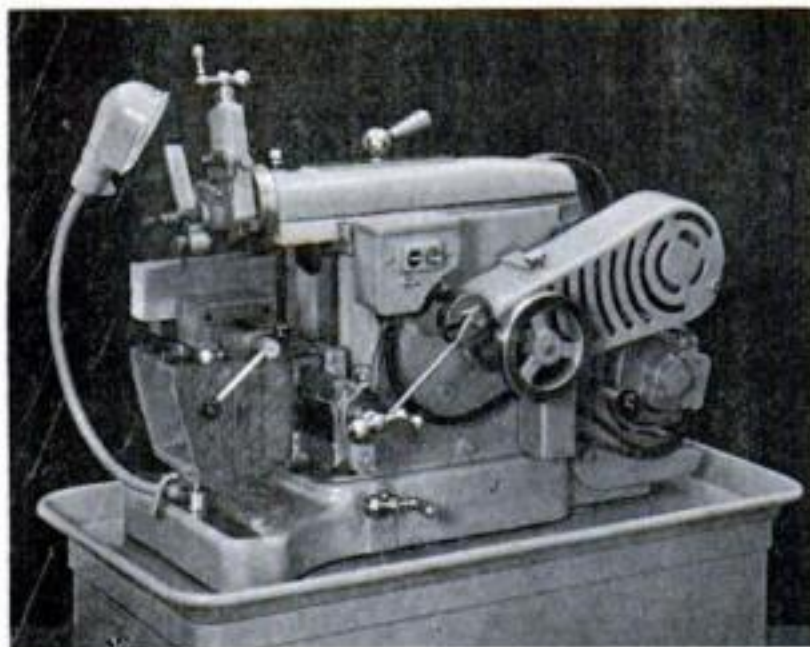


7"

## BENCH SHAPER

An accurate, compact bench shaper that meets the need for fast, precision work in toolroom, production, experimental, and maintenance shops. It is ruggedly designed and carefully constructed to give long, dependable service with a minimum of maintenance.

*The only bench shaper with pressure lubrication!*



#### SPECIFICATIONS and PRICE

Length of ram stroke ..... 0 to 7"  
 Strokes per minute, approx.  
     ..... 42-75-120-195  
 Cutting speeds ..... 3 to 114 fpm.  
 Tool head swivels ..... 360°  
 Horizontal table travel ..... 9½"  
 Vertical table travel ..... 5"  
 Table to ram ..... ½" to 5½"  
 Power cross feeds ..... .002" to .012"

PRICE. Cat. No. CS100 less  
 motor, tool holder and  
 steel stand, f.o.b. factory  
     \$602

188 POPULAR SCIENCE



TELESCOPIC  
TAPER ATTACHMENT



MILLING ATTACHMENT



MICROMETER  
CARRIAGE STOP



TELESCOPING JAW  
FOLLOWER REST



10-IN-1  
TOOL HOLDER



PIPE CENTERS



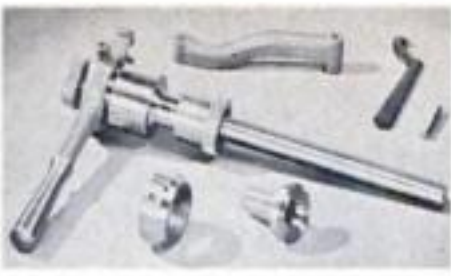
HANDLEVER  
DOUBLE TOOL  
CROSS SLIDE



UNIVERSAL TABLE  
CE9156.....\$106



Tools and

**ATTACHMENTS**

**HANDLEVER  
COLLET  
ATTACHMENT**



**RED ARROW COLLETS**



**BALL BEARING  
LIVE CENTERS**



**SQUARE TURRET  
TOOL BLOCK**

## Get More Work out of Your Machines with these Attachments

*Cut Machining Time • Simplify Difficult Jobs • Speed Up Tooling • Handle More Types of Jobs*



**EXTERNAL  
GRINDING  
ATTACHMENT**



**TELESCOPING JAW  
STEADY REST**



**HANDWHEEL  
COLLET  
ATTACHMENT**



**FOUR-POSITION  
CARRIAGE STOP**



**HANDLEVER  
BED TURRET**



**HANDLEVER  
TAILSTOCK  
TURRET**



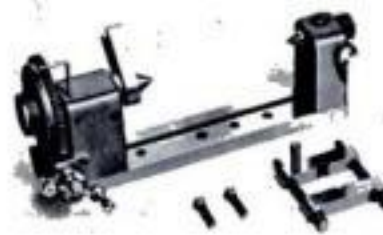
**SWIVEL  
MACHINE VISE  
CE9100.....\$28.35**



**ROTARY  
INDEXING TABLE  
CE9144.....\$58.50**



**CUTTER BIT  
GRINDING BLOCK  
CE2168.....\$7.50**



**INDEXING  
CENTERS  
CE9635.....\$73.25**

*Prices  
on  
Next  
Page*

FEBRUARY 1960 189



# PRICES OF LATHE ATTACHMENTS

Partial list—write for complete catalog

(Catalog numbers appear below prices)	9" LATHES	10K LATHES	10" LATHES	13" LATHES	14½" LATHES	16" LATHES
Ball Bearing Live Center, 60° point	\$18.20 CE3900	\$18.20 CE3900	\$18.20 CE3900	\$21.55 CE3901	\$21.55 CE3901	\$21.55 CE3901
Ball Bearing Live Center, 60° hollow point	\$18.20 CE3903	\$18.20 CE3903	\$18.20 CE3903	\$21.55 CE3904	\$21.55 CE3904	\$21.55 CE3904
Pipe Center, ½" to 3" pipe, (less shank), others to 8" cap.	\$6.30 CE2160	\$6.30 CE2160	\$6.30 CE2160	\$6.30 CE2160	\$6.30 CE2160	\$6.30 CE2160
Shank for CE2160	\$5.40 CE2172	\$5.40 CE2172	\$5.40 CE2172	\$6.25 CE2174	\$6.25 CE2174	\$6.25 CE2174
Four-Position Carriage Stop	\$25. CL2185NK	\$25. CL2185NK	\$26. CL2185R	\$27. CL2185T	\$30. CL2185FH	\$30. CL2185FH
Micrometer Carriage Stop	\$22.95 CL968NK	\$22.95 CL968NK	\$23.95 CL968R	\$27. CL968T	\$28. CL968FH	\$28. CL968FH
10-in-1 Tool Holder	\$14.70 CE1413NK	\$14.70 CE1413NK	\$15.85 CE1413R	\$18.85 CE1413T	\$21.85 CE1413F	\$22.70 CE1413H
Square Turret Tool Block	\$44.75 CL3375N	\$49.50 CL3375K	\$53. CL3375R	\$59. CL3375T	\$85. CL3375F	\$92. CL3375H
Telescoping Jaw Follower Rest	\$10.10 CL2395N	\$11.45 CL2395K	\$12.55 CL2395R	\$14.20 CL2395T	\$17. CL2395F	\$18.60 CL2395H*
Telescoping Jaw Steady Rest	\$15.85 CL2400N	\$17.25 CL2400K	\$19.75 CL2400R	\$24. CL2400T	\$28. CL2400F	\$31.15 CL2400H*
Taper Attachment	\$93. CL428NK	\$93. CL428NK	\$194. CL1545R	\$233. CL1545T	\$251. CL1545F	\$281. CL1545H
Milling Attachment	\$53.50 CL2680NK	\$53.50 CL2680NK	\$66.50 CL2680R	\$82.50 CL2680T	\$96.50 CL2680F	\$112. CL2680H
External Grinding Attachment with bolt	\$72.20 CE301B	\$72.20 CE301B	\$72.75 CE301B	\$73.25 CE301B	\$73.85 CE301B	\$73.85 CE301B
11-pc. Tool and Chuck Assortment	\$78. CL2890NK	\$78. CL2890NK	\$125. CL2890R	\$156. CL2890Q	\$182. CL2890M	\$208. CL2890H
Handlever Double Tool Cross Slide	\$98.50 CL2030N	\$104.50 CL2030K	\$115. CL2030R	—	—	—
Handlever Bed Turret	\$284. CL1611N	\$291. CL1611K	\$298. CL1611R	\$320. CL1611T	—	—
Handlever Tailstock Turret	\$126.50 CL2045N	\$134.50 CL2045K	\$146.50 CL2045R	\$175.50 CL2045T	—	—
Handlever Collet Attachment	\$85.50 CL5206N	\$101. CL5206K	\$135. CL5206L	\$150. CL5206Q	\$164. CL5206M	\$178. CL5206H
Handwheel Collet Attachment	\$21.50 CL4306N	\$24.50 CL4306K	\$60. CL4306L	\$65.50 CL4306Q	\$70. CL4306M	\$73. CL4306H
Red Arrow Collets Std. round—by 64ths	\$4.80 CE3050	\$4.95 CE3051	\$5.95 CE3054	\$5.95 CE3054	\$5.95 CE3054	\$5.95 CE3054

\* Attachments for 16" Lathes can be used on 16-24" Lathes except for those indicated (\*). Many of these attachments can be used on South Bend Turret Lathes and also other makes of lathes. Catalog numbers appear below all prices—they must appear on all orders.



# SOUTH BEND LATHE DISTRIBUTORS

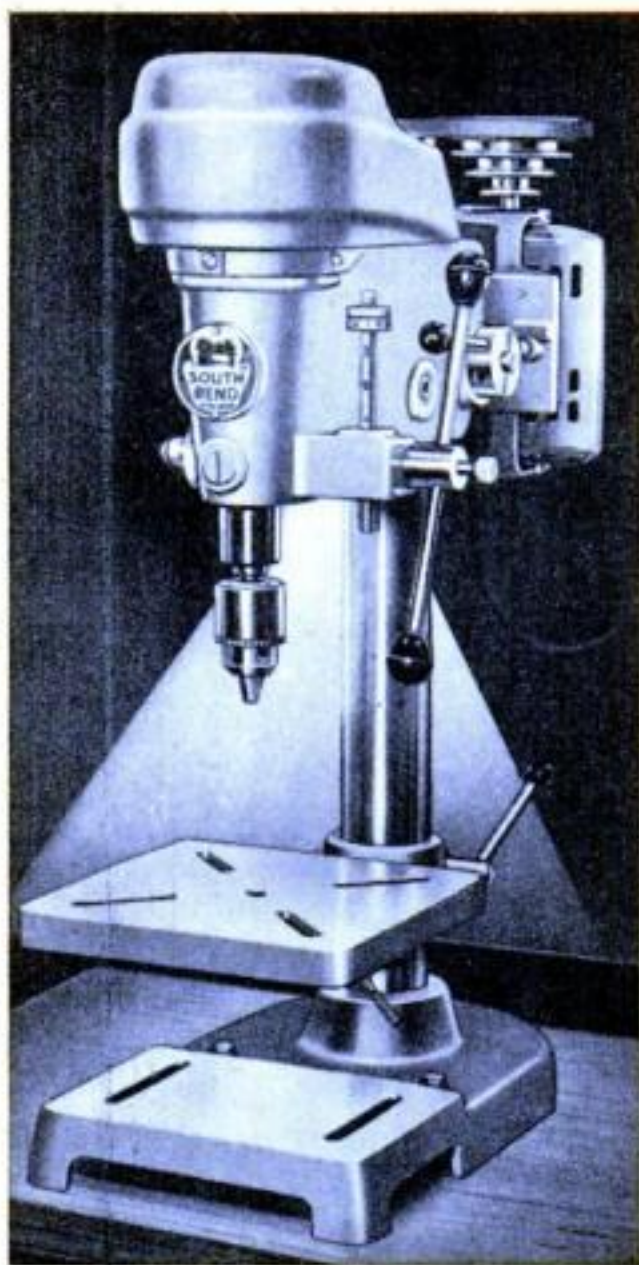
**ALA.** Birmingham, Ala., Modern Machinery Associates, Inc. Ph. TR 9-1644  
**ARIZ.** Phoenix, Ariz., Copper State Machinery Co. Ph. BR 5-9022  
**ARK.** Tucson, Ariz., Copper State Machinery Co. Ph. EA 6-3830  
 Fort Smith, Ark., Lyons Machinery, Co.  
**CALIF.** Little Rock, Ark., Lyons Machinery Co. Ph. FRanklin 4-5007  
 Los Angeles, Calif., W. T. Wills Machinery. Ph. AN 8-4213  
 Redwood City, Calif., Riley Precision Tool. Ph. Emerson 8-4184  
 San Diego, Calif., W. T. Wills Machinery Co. Ph. BElmont 9-7881  
 San Francisco, Calif., Riley Precision Tool. Ph. EM 8-4184  
**COLO.** Denver, Colo., M. L. Foss, Inc. Ph. KE 5151  
 Grand Junction, Colo., Salt Lake Hardware Co., Ph. CH2-0070  
**CONN.** Hamden, Conn., Gilbert & Richards, Inc. Ph. CH 8-5558  
 New Haven, Conn., Gilbert & Richards, Inc. Ph. CH 8-5558  
 Plainville, Conn., Ideal Machinery & Supply. Ph. SH 7-1651  
**DEL.** Wilmington, Del., Holloway Brothers Tools, Inc. Ph. WY 4-5768  
**D.C.** Washington, D.C., Carey Mch. & Supply, Inc. Ph. DuPont 7-2204  
**FLA.** Ft. Lauderdale, Fla., The Crosby Co. Ph. LO 6-8617  
 Jacksonville, Fla., J. G. Christopher Co. Ph. EL 3-3961  
 Miami, Fla., Gondas Corp. Ph. PL 7-5531  
 Miami, Fla., Harry P. Leu, Inc. Ph. FRanklin 9-3404  
 Orlando, Fla., Harry P. Leu, Inc. Ph. GA 2-9891  
 Tampa, Fla., Regan Industrial Supply Co. Ph. RE 7-2108  
**GA.** Atlanta, Ga., Chandler Machinery Co. Ph. WAL 3843  
 Savannah, Ga., Georgia Supply Co. Ph. 2-7131  
**IDAHO** Boise, Idaho, Salt Lake Hardware Co. Ph. 4-2555  
**ILL.** Chicago, Ill., H. J. Volz Machinery Co. Ph. LO 1-0354  
 Danville, Ill., Danville Industrial Supply Co. Ph. 695  
 Decatur, Ill., Miller Industrial Supply Co. Ph. 8-3474  
 Moline, Ill., John J. Normoyle Co. Ph. 4-2416  
 Peoria, Ill., Couch & Heyle, Inc. Ph. 4-3101  
 Rockford, Ill., Factory Supplies Co. Ph. WO 4-6731  
 Springfield, Ill., Schlitt Supply Co. Ph. 8-4338  
**IND.** Evansville, Ind., Brown & Hubert, Inc. Ph. HA 5-9049  
 Evansville, Ind., Orr Iron Company, Inc. Ph. HA 5-5111  
 Indianapolis, Ind., Kenneth J. Galm Co. Ph. ME 4-3467  
 Richmond, Ind., Richmond Industrial Supply Co. Ph. 2-3013  
 South Bend, Ind., South Bend Lathe, Inc. Ph. CE 2-3311  
**IOWA** Burlington, Iowa, Kacena Company. Ph. PL 2-1796  
 Cedar Rapids, Iowa, Kacena Company. Ph. 3-0255  
 Clinton, Iowa, Kacena Company. Ph. PL 2-1796  
 Des Moines, Iowa, Peerless Supply Company. Ph. AM 5-0333  
 Waterloo, Iowa, Newkirk Sales Company. Ph. Adams 3-3549  
**KAN.** Dodge City, Kan., Scheufler Supply Co. Ph. HU 2-2151  
 Great Bend, Kan., Scheufler Supply Co. Ph. 4321  
 Wichita, Kan., Watkins, Inc. Ph. Hobart 4-7301  
**KY.** Harlan, Ky., Hall Equipment Sales, Inc. Phone 1544  
 Louisville, Ky., Neill-LaVielle Supply Co. Ph. Calhoun 5401  
**LA.** Paducah, Ky., Hannan Supply Co. Ph. 5-5456  
 New Orleans, La., Richards & Holmes Mch., Inc. Ph. JA 5-7281  
**ME.** Shreveport, La., Richards Machinery & Supply Co. Ph. 2-0331  
 Auburn, Me., W. D. Matthews Machinery Co. Ph. 4-5759  
**MD.** Bangor, Me., N. H. Bragg & Sons. Ph. 7311  
 Baltimore, Md., Carey Machinery & Supply Co., Inc. Ph. BR 6-1600  
 Oakland, Md., Acorn Associates. Ph. DE 4-2681  
**MASS.** Boston, Mass., Packard Machinery Co. Ph. UN 4-3400  
 Cambridge, Mass., Packard Machinery Co. Ph. UN 4-3400  
 Southeastern Mass. area—Reynolds, Inc.  
 at Providence, R.I. Ph. ST 1-3010  
**MICH.** Springfield, Mass., A. H. MacBriar. Ph. LO 7-3635  
 Adrian, Mich., Beal Supply Co. Ph. COlfax 5-5193  
 Alpena, Mich., Fochtman Motor Co. Ph. 1006  
 Detroit, Mich., Robt. F. Brown Machinery. Ph. Temple 2-3540  
 Detroit, Mich., Lee Machinery Co. Ph. LO 7-4257  
 Flint, Mich., Factory Tool & Supply Co. Ph. 9-5811  
 Gaylord, Mich., Fochtman Motor Co., Ph. 2621  
 Grand Rapids, Mich., Dennis Machine Tool Co. Ph. GL 9-3241  
 Jackson, Mich., C. E. Hamlin Co. Ph. 2-8255  
 Lansing, Mich., R. F. Brown Mch. (Detroit) Ph. Temple 2-3540  
 Menominee, Mich., Christensen Machinery. Ph. UN 3-5541  
 Muskegon, Mich., Lakeshore Machinery & Supply. Ph. 26-655  
 Niles, Mich., H. L. Swartz Machinery. MUTual 3-2231  
 Petoskey, Mich., Fochtman Motor Co., Inc. Ph. DI 7-2577  
 Saginaw, Mich., Saginaw Supply Corp. Ph. 5-3447  
 Traverse City, Mich., Fochtman Motor Co. Ph. WI 6-6278  
**MINN.** Minneapolis, Minn., G. C. Peterson Mch. Ph. FEderal 2-8211  
**MO.** St. Paul, Minn., Anderson Machine Tool Co. Ph. Midway 5-5831  
 Joplin, Mo., Industrial Equipment Co. Ph. MA 4-1400  
 Kansas City, Mo., Bossert Co. Ph. BA 1-9033  
 St. Louis, Mo., Mill Supply & Machinery Co. Ph. FOrest 1-4717  
**MONT.** Springfield, Mo., Industrial Equipment Corp. Ph. 4-1575  
 Billings, Mont., Great Northern Tool & Supply Co. Ph. 2-2175  
 Billings, Mont., Hines Motor Supply Co., Inc. Ph. 2155  
 Bozeman, Mont., Hines Motor Supply Co., Inc. Ph. 262  
 Great Falls, Mont., Hines Motor Supply Co., Inc. Ph. GL 3-5474  
 Lewistown, Mont., Hines Motor Supply Co., Inc. Ph. 248  
 Miles City, Mont., Hines Motor Supply Co., Inc. Ph. 65  
**NEBR.** Lincoln, Nebr., Port Huron Machinery & Supply Co. Ph. 2-4211  
 Omaha, Nebr., Fuchs Machinery & Supply Co. Ph. AT 7050  
 Scottsbluff, Nebr., Herber Machinery Supply Co. Ph. 2306  
**N.J.** Kenilworth, N.J., Stephenson Machinery Co. Ph. CH 1-1040  
 Newark, N.J., Stephenson Machinery Co. See Kenilworth  
**N.M.** Albuquerque, N.M., Equipment Sales Co. Ph. 3-6769  
**N.Y.** Albany, N.Y., Sager-Spuck Supply Co., Inc. Ph. 3-4461

**N.C.** Binghamton, N.Y., Binghamton Ind. Supply Co. Ph. BI 4-3221  
 Buffalo, N.Y., R. C. Neal Company. Ph. MO 1110  
 Elmira, N.Y., LeValley, McLeod, Inc. Ph. 4-6163  
 Elmira Hts., N.Y., R. C. Neal Co. Ph. 5168  
 Mineola, N.Y., A. C. Colby Machinery. Ph. PI 7-1551  
 New York, N.Y., A. C. Colby Machinery. Ph. Canal 6-4140  
 Olean, N.Y., LeValley, McLeod, Inc. Ph. 2-2111  
 Peekskill, N.Y., Lakeland Corp. Ph. PEekskill 7-2838  
 Rochester, N.Y., R. C. Neal Co., Inc. Ph. GLENwood 3-9390  
 Rochester, N.Y., Ogden R. Adams, Inc. Ph. LU 6-4470  
 Syracuse, N.Y., R. C. Neal Co., Ph. GR 5-9911  
 Utica, N.Y., Charles Millar & Sons Co. Ph. 2-5121  
 Watertown, N.Y., Thos. H. Bradley, Inc. Ph. 5400  
 Wellsville, N.Y., Kailbourne Supply Co. Ph. 1859  
 Charlotte, N.C., Dillon Supply Co.  
 Charlotte, N.C., Machinery Supply Co. Ph. FRanklin 6-7569  
 Charlotte, N.C., Matthews-Morse Sales Co. Ph. ED 3-1187  
 Durham, N.C., Dillon Supply Co. Ph. 9-1963  
 Goldsboro, N.C., Dillon Supply Co. Ph. 746  
 Greensboro, N.C., Jeffreys Engineering & Equipment Co., BR 4-6364  
 Greensboro, N.C., Smith-Courtney Co. Ph. BR 2-4557  
 Hickory, N.C., Smith-Courtney Co. Ph. DI 5-2201  
 Raleigh, N.C., Dillon Supply Co. Ph. 2-7771  
 Rocky Mount, N.C., Dillon Supply Co. Ph. 2-2163  
 Shelby, N.C., Shelby Supply Co., Inc. Ph. HU 7-8531  
 Winston-Salem, N.C., Kester Machinery Co. Ph. SA 2-6181  
 Wilmington, N.C., Mill & Contractors Supply. Ph. 7757  
**N.D.** Fargo, N.D., Reinhard Brothers, Inc. Ph. 6421  
**OHIO** Akron, Ohio, Reynolds Machinery Co. Ph. BL 3-7095  
 Cincinnati, Ohio, The Wm. T. Johnson Co. Ph. VA 1-5671  
 Cleveland, Ohio, Reynolds Machinery Co. Ph. EN 1-3745  
 Columbus, Ohio, Reynolds Machinery Co. Ph. CA 4-7493  
 Dayton, Ohio, C. H. Gosiger Machinery Co. Ph. Baldwin 8-5174  
 Toledo, Ohio, Reynolds Machinery Co. Ph. GR 2-6043  
**OKLA.** Oklahoma City, Okla., Hart Industrial Supply. Ph. RE 9-2541  
 Tulsa, Okla., Hart Industrial Supply Co. Ph. LU 3-2175  
 Tulsa, Okla., Krisman Industrial Supply Co. Ph. DI 3-6213  
**ORE.** Portland, Ore., Star Machinery Co. Ph. CA 8-7395  
**PA.** Erie, Pa., Modern Machinery Sales Co. Ph. 6-2729  
 Philadelphia, Pa., W. B. Rapp Machinery Co. Ph. Market 7-0490  
 Pittsburgh, Pa., Tranter Mfg. Co. Ph. CO 1-0600  
 Scranton, Pa., The Charles B. Scott Co. Ph. 2-8221  
 Williamsport, Pa., Lowry Electric Co. Ph. 2-7841  
 York, Pa., York Machinery & Supply Co. Ph. 29-531  
**R.I.** Providence, R.I., Reynolds, Inc. Ph. ST 1-3010  
**S.C.** Charleston, S.C., Charleston Supply Co. Ph. 2-8851  
 Columbia, S.C., Columbia Supply Co. Ph. ALPine 4-2724  
 Florence, S.C., O'Brian-Mace Co. Ph. 8216  
 Greenville, S.C., Carolina Supply Co. Ph. 2-3571  
 Watertown, S.D., Frank Miller Company. Ph. 2-505  
**S.D.** Mitchell, S.D., Mitchell Iron & Supply Company. Ph. 2447  
**TENN.** Chattanooga, Tenn., Jones-Sylar Supply Co. Ph. 5-1601  
 Knoxville, Tenn., The W. S. Murrian Co. Ph. 3-4331  
 Memphis, Tenn., Lewis Supply Co. Ph. 5-6871  
 Nashville, Tenn., Tennessee Machinery Co. Ph. AL 4-3417  
**TEX.** Amarillo, Tex., Amarillo Supply Co. Ph. DR 2-7791  
 Brownsville, Tex., Alamo Iron Works. Ph. LI 2-4343  
 Corpus Christi, Tex., Alamo Iron Works. Tulip 3-9241  
 Dallas, Tex., Nicholas & Parks Machinery Co. Ph. RI 3246  
 El Paso, Tex., Zork Hardware Co. Ph. 2-3621  
 Ft. Worth, Tex., Well Machinery & Supply. Ph. ED 6-2391  
 Houston, Tex., Wessendorff, Nelms & Co. Ph. WA 8-5151  
 Longview, Tex., Machinery Supply & Grinding Co. Ph. PL 3-3171  
 Lubbock, Tex., MacAustin Company. Ph. PO 3-7349  
 San Antonio, Tex., Alamo Iron Works. Ph. CA 3-6161  
 Tyler, Tex., Mason Machinery Co. Ph. 2-0911  
**UTAH** Salt Lake City, Utah, Salt Lake Hardware Co. Ph. DA 8-8211  
**VT.** Barre, Vt., Reynolds & Son, Inc. Ph. GRAnite 6-4183  
**VA.** Norfolk, Va., Mill Supplies Corp. Ph. MA 2-7008  
 Richmond, Va., Smith-Courtney Co. Ph. BE 2-4581  
 Roanoke, Va., Graves-Humphreys, Inc. Ph. DI 3-8011  
 Wytheville, Va., R. P. Johnson Sons. Ph. CA 8-2136  
**WASH.** Seattle, Wash., Star Machinery Co. Ph. MA 3-0760  
 Spokane, Wash., Star Machinery Co. Ph. RI 6121  
**W. VA.** Charleston, W. Va., Wm. S. Bolden Co., Inc. Ph. DI 3-5644  
**WIS.** Milwaukee, Wis., W. A. Voell Machinery Co. Ph. GR 6-0990

## CANADIAN DISTRIBUTORS

\*Calgary, Alta., Can., Canadian Fairbanks-Morse. Ph. 6-4061  
 Edmonton, Alta., Can., Can. Fairbanks-Morse. Ph. 2-7161  
 Ft. Williams, Ont., Can., Can. Fairbanks-Morse. Ph. 3-3458  
 Halifax, N. S., Can., Can. Fairbanks-Morse. Ph. 2-6431  
 London, Ont., Can., Canadian Fairbanks-Morse. Ph. 7-1961  
 Montreal, Que., Can., Can. Fairbanks-Morse. Ph. UN 1-9011  
 Ottawa, Ont., Can., Canadian Fairbanks-Morse. Ph. 3-7779  
 Quebec, Que., Can., Canadian Fairbanks-Morse. Ph. 2-1548  
 Regina, Sask., Can., Canadian Fairbanks-Morse. Ph. JO 9-5491  
 St. John, N. B., Can., Canadian Fairbanks-Morse. Ph. OX 3-3291  
 Saskatoon, Sask., Can., Canadian Fairbanks-Morse. Ph. 6195  
 Toronto, Ont., Can., Can. Fairbanks-Morse. Ph. EM 8-8321  
 Vancouver, B. C., Can. Fairbanks-Morse. Ph. Tatlow 0211  
 Victoria, B. C., Can. Fairbanks-Morse. Ph. 4-4171  
 Windsor, Ont., Can. Fairbanks-Morse. Ph. Clearwater 3-5293  
 Winnipeg, Man., Can. Fairbanks-Morse. Ph. 926-544  
 \*Ample Parking Available





**SOUTH BEND  
14" PRECISION DRILL PRESSES**

Engineered and built with exacting thoroughness, South Bend Drill Presses have exceptional accuracy, rigidity and dependability. Exclusive Rack Type Depth Gauge—no quill deflection! Bench, floor and multiple spindle models.

Bench Model No. CD414B

**\$128**

**SOUTH BEND LATHE, INC.**

SOUTH BEND 22, INDIANA

*Building Better Tools Since 1906*

Printed in U.S.A.





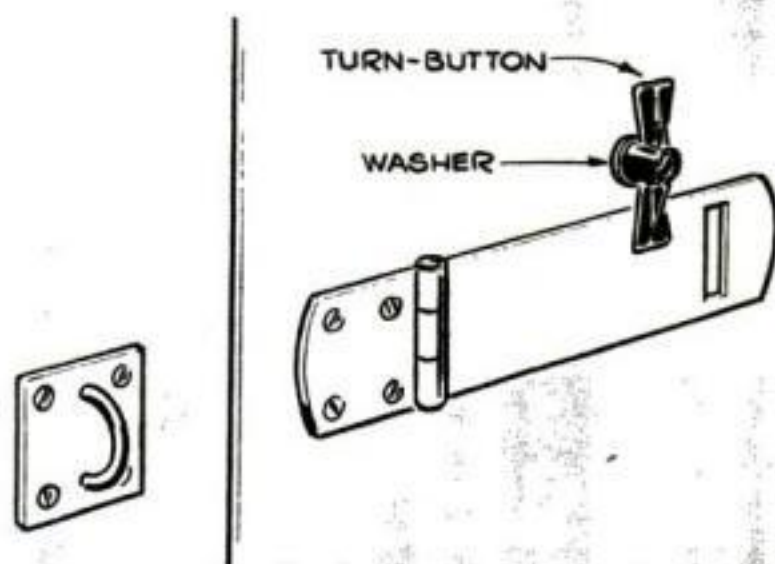


### Darkroom Carrying Rack

FOR the part-time darkroom, such as kitchen or bath, keep your solutions together in a milk-bottle rack. If your dairy can't supply one, try a department store. —*W. H. McClay, Pasadena, Cal.*

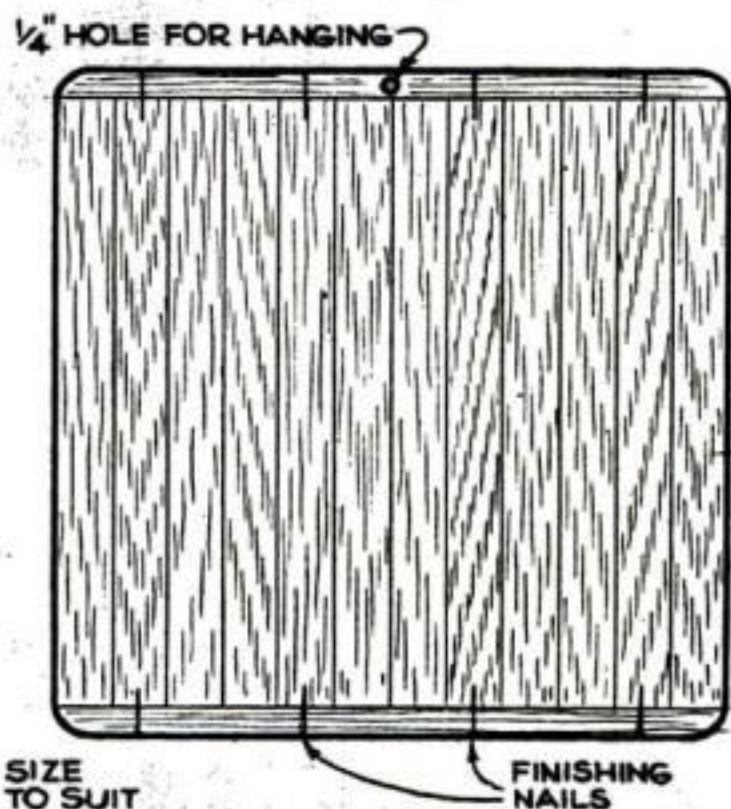
## Short Cuts and Tips

FROM PS READERS



### Securing an Open Hasp

TO KEEP a hasp from swinging out to jab you or catch in your clothing every time you open the door, pin the leaf back with a turn-button installed with a washer. —*Victor H. Lamoy, Upper Jay, N. Y.*



### Breadboard from Flooring

OAK or maple flooring makes a good cutting board for the kitchen. Your dimensions determine what size bundle to buy. My board measures 15" by 22".

Cut pieces to identical lengths and trim two outside edges square. Apply glue to tongues and grooves and assemble with bar clamps. Rip two narrow end cleats and attach with glue and nails. Remove excess glue, sand, and apply salad oil. —*E. B. Johnson, Stambaugh, Mich.*

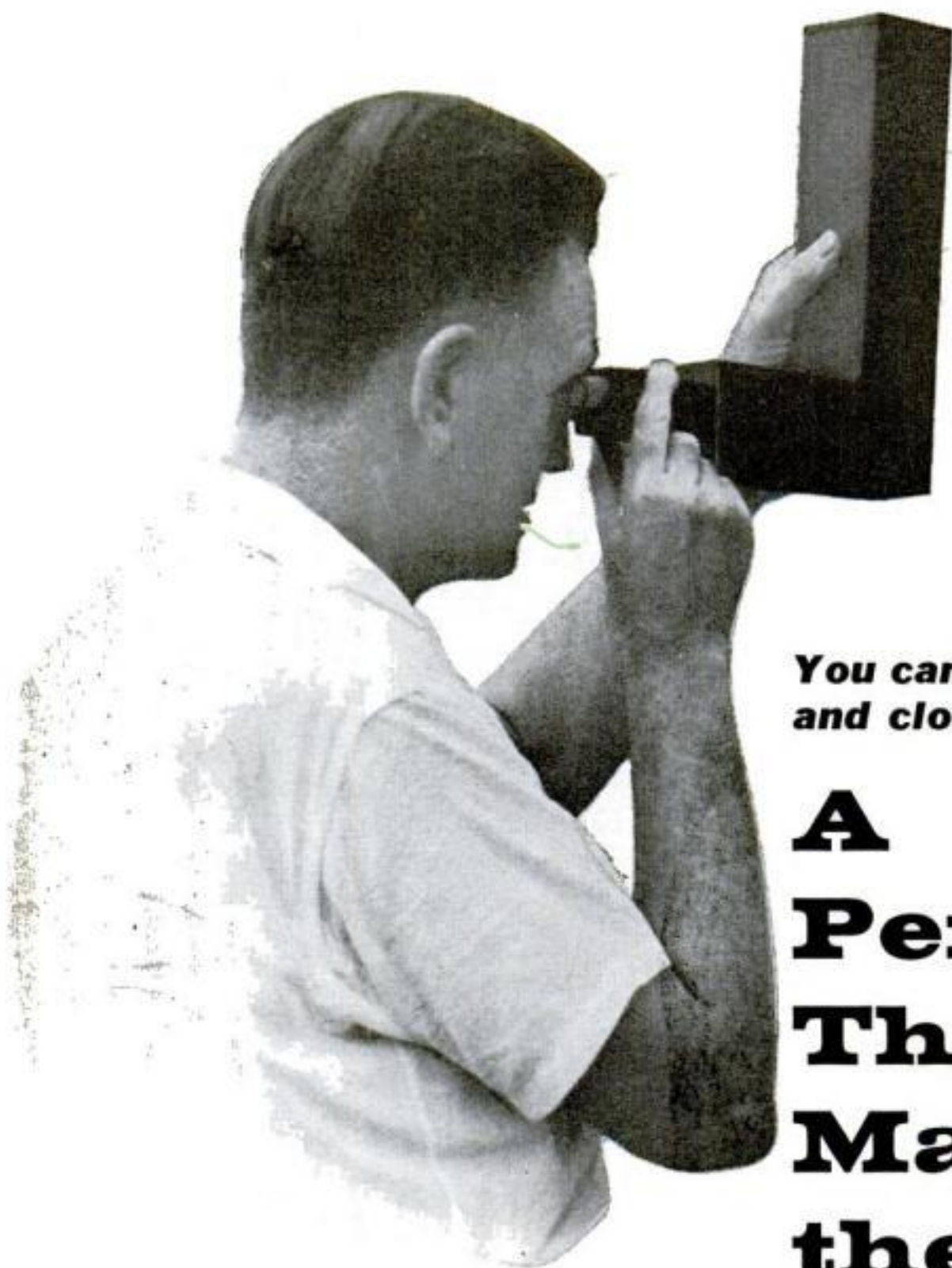


### Removing Stubborn Glue

WHEN sandpaper misses bits of glue in pits and scratches on a surface you're refinishing, try a plain rubber eraser. It can't mar the wood, and it works particularly well on old contact cement. —*H. L. Wilkins, Washington Court House, Ohio.*

▶▶▶REPLACEMENT tires for tricycles are sometimes hard to find. Try stringing a door spring through a length of rubber hose. —*Mrs. L. L. Schultz, Berwyn, Ill.*





***You can see over and around,  
and close up, too, by making—***

## **A Periscope That Magnifies the Scene**

**By Charles D. Neal**

**W**HEN was the last time you yearned to be a foot taller? At that parade you didn't see because of heads bobbing in front of you?

Here's a periscope that will let you peer over heads and around corners. As a bonus, it magnifies the scene 3.8 times. It's ideal for studying wildlife or identifying aircraft, and the kids will enjoy using it from a secret hide-out.

A 14"-by-18" piece of  $\frac{1}{4}$ " veneer plywood will supply all the casing parts except for the eye-lens mount; that's made from a scrap of birch or maple.

The optical equipment consists of two front-surface mirrors you can pick up for less than a dollar, and two lenses that will cost under \$2.50. The top mirror is

43 mm. by 46 mm., and the bottom one is 37 mm. square. The double-concave front lens has a 19-mm. diameter and a minus-50-mm. focal length. The achromatic objective lens behind it is 52 mm. in diameter, with a 192-mm. focal length.

Cut out the L-shaped side members from the plywood first. The other parts are simple rectangles, except for the mirror-mounting strips which are notched or beveled as shown. The eyepiece is made by boring the center from a 1"-by-1"-by- $1\frac{3}{8}$ " block of hardwood, using two Forstner bits. A  $\frac{13}{16}$ "-diameter hole is bored to a depth of  $1\frac{3}{16}$ "; for the remaining  $\frac{3}{16}$ " use a  $\frac{1}{2}$ " bit. The eyepiece shown was contoured on the lathe, but this was for appearance, not efficiency. The eye lens is inserted from the back and secured with a mounting ring of  $\frac{1}{8}$ " cardboard.

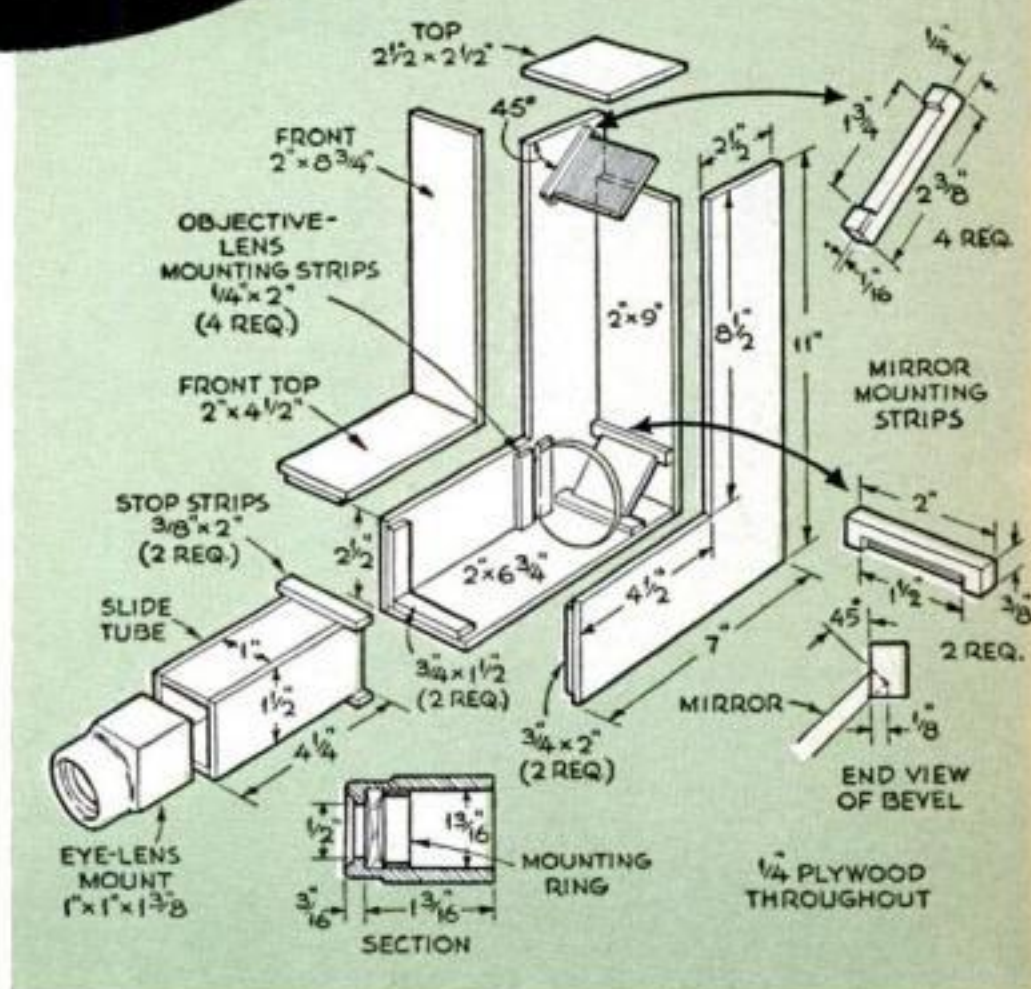




Using  $\frac{5}{8}$ " wire nails, attach the two L-shaped side pieces to the back and the bottom, and join the front and front top piece as shown. Assemble the four members of the slide tube. Now carefully locate the mirrors and the objective lens, making certain the mirrors are mounted at a 45-degree angle, facing and exactly parallel to one another.

Tack the mounting strips in place temporarily with  $\frac{3}{8}$ " brads. Also fasten the four slide-tube guide strips in place, locating three of them flush with the front edge of the L-shaped tube and the fourth on the underside of the front top. Attach the two stop strips at the back of the slide tube and insert the eyepiece at the front. Drop the slide tube into its channel.

To check the optical mechanism, put the front assembly temporarily in place. Look through the eyepiece, moving the slide tube in and out until a distant object is in sharp focus. If difficulties are encountered, recheck the positions of the mirrors and lenses. The top mirror must reflect the image down the vertical tube to the lower mirror, which diverts it horizontally through the magnifying lens. When adjustments are complete, remove mirrors and lenses, secure the mounting strips, and apply a coat of flat black paint to all wood surfaces. When the paint is dry, replace optical parts permanently and complete the assembly.



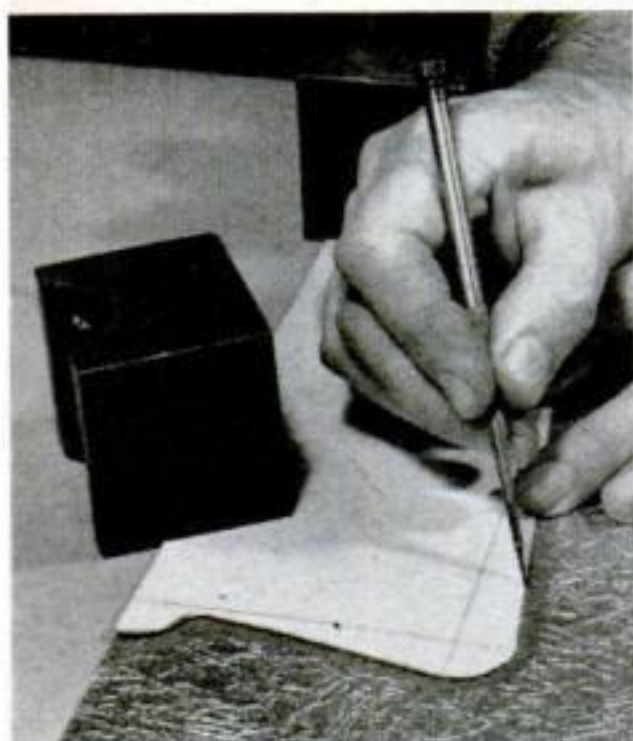
#### LIST OF OPTICAL PARTS (one each)

- 43 mm. x 46 mm. front-surface mirror
- 37 mm. x 37 mm. front-surface mirror
- 19-mm. double-concave lens of minus-50-mm. focal length
- 52-mm. achromatic objective lens of 192-mm. focal length

All parts available from the Edmund Scientific Co., Barrington, N. J.



## Use dark coatings for bright-surface metals



**MODEL-AIRPLANE DOPE** is fine for scribe work. Ordinary lacquers tend to tear, producing ragged lines. If metal is to be painted, use some first as a marking base. It will usually take pencil lines readily.



**MARKER INKS** for labeling provide good base for scribing and come with built-in brush. Dab color on thin but evenly. For quick marking of small areas, rub on grease pencil and scribe it with a sharp lead pencil.



**TOOLMAKER'S INKS**, made especially for layout work, now come in spray cans. Usually blue, they dry quickly and have a good masking effect. You can remove most coatings from the metal with lacquer thinner.

# Marking Metal for Layouts

By **Walter E. Burton**

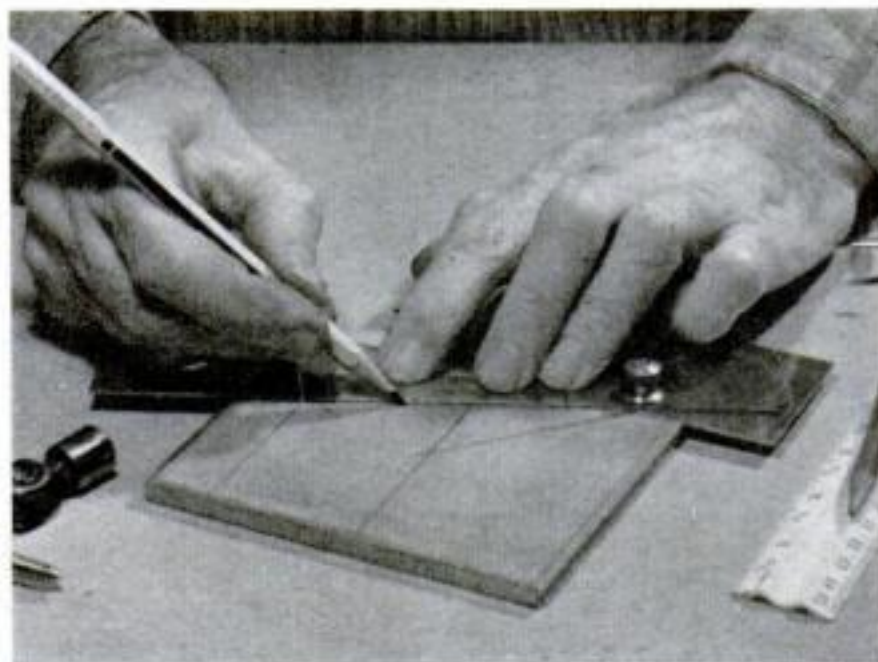
**E**VER try to make a mark on shiny metal? Indicating precisely where a hole is to be drilled or a cut made is often

a problem. Most metals don't take a pencil mark, which often wouldn't be accurate enough anyway. Other metals either defy the sharp point of a scribe, or shouldn't be permanently marked.



## Plating a surface

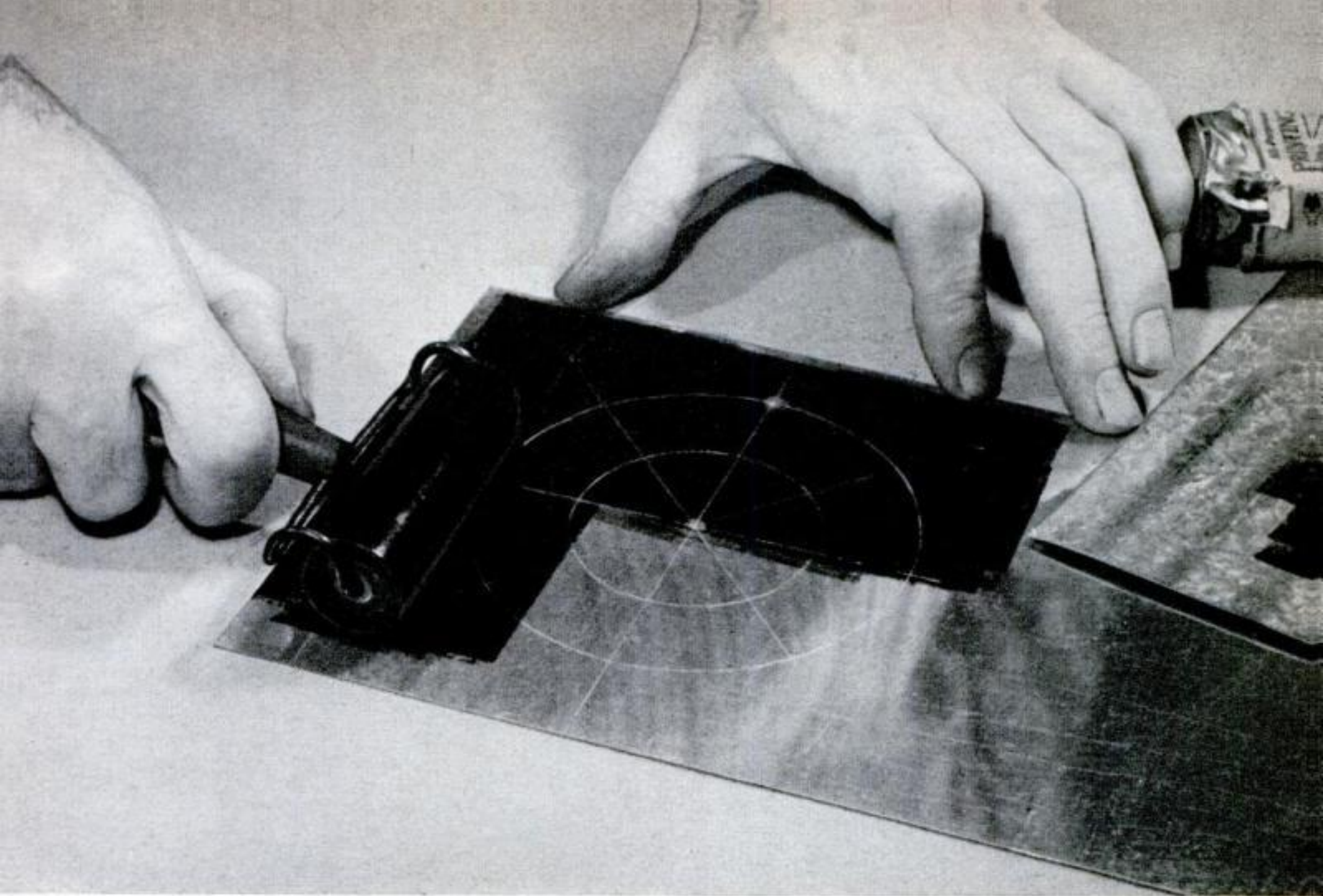
**OLD-TIME METHOD** of making metal markable is to swab it with a solution of copper sulfate, which plates the surface. Since color is fairly permanent and messy to apply, method is giving way to more convenient modern markers.



## Dulling a surface

**SHINY METAL** that will be finished dull or later painted can be made to take pencil lines by removing the sheen. A paste of fine silicon carbide rubbed on with a steel block is best for this, but fine abrasive paper can also be used.





**TO BRING OUT FAINT LINES** that have already been scribed on metal, printer's ink has a special virtue. Applied with a rubber roller, it will make

the lines magically reappear. Don't use it, however, for general marking, as it dries slowly, is not as easy to clean off as other markers.

The solution? Take a tip from the pros and prepare your metal first with inks and colorings that make markings stand out clearly. These provide a coating on which a scribe can etch accurate lines.

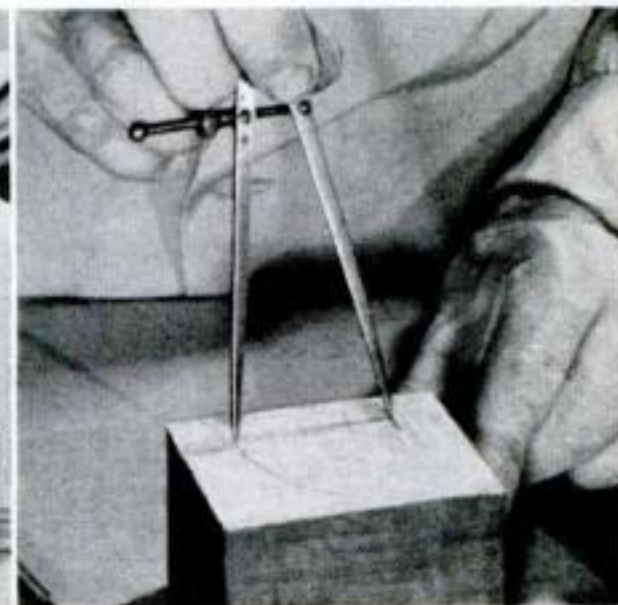
Some markers are special preparations; some can be as common as shoe polish. Dark colors are naturally used for light metals and light colors for dark ones. Here's a run-down on some tricks.

### ***Use light-colored coatings on dark-surface metals***

**NON-BRIGHT SURFACES**, such as cast iron and age-darkened steel need light colors for contrast. Apply whiting (powdered chalk) mixed with alcohol. Or rub on blackboard chalk and blow off the excess.

**WHITE SHOE POLISH** is one of easiest materials to apply and can be used in place of chalk or whiting. Chinese white and tempera water-mixed paints, all easy to obtain, can be swabbed on in the same way.

**TEST SURFACE** with a compass or scribe. If coating is not even or dense enough, you may need a second application. For pencil marking, use a sharp point but soft lead. Water removes most of the white coatings.



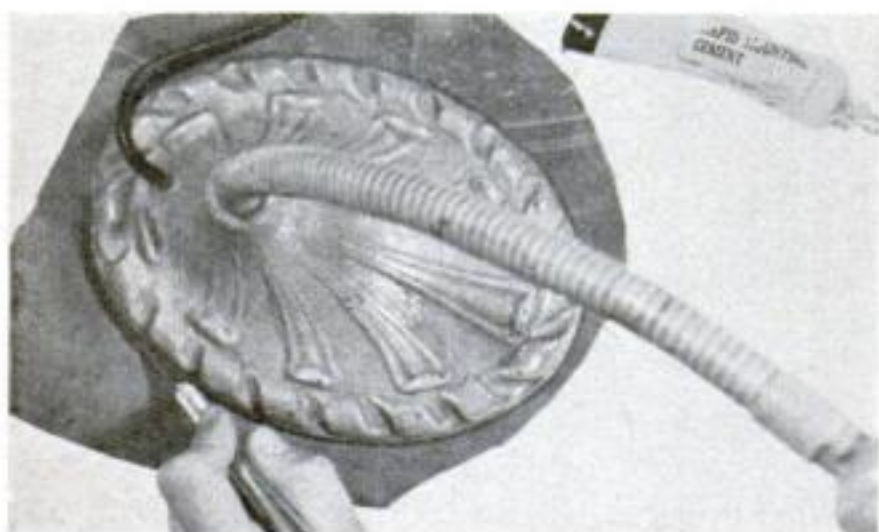
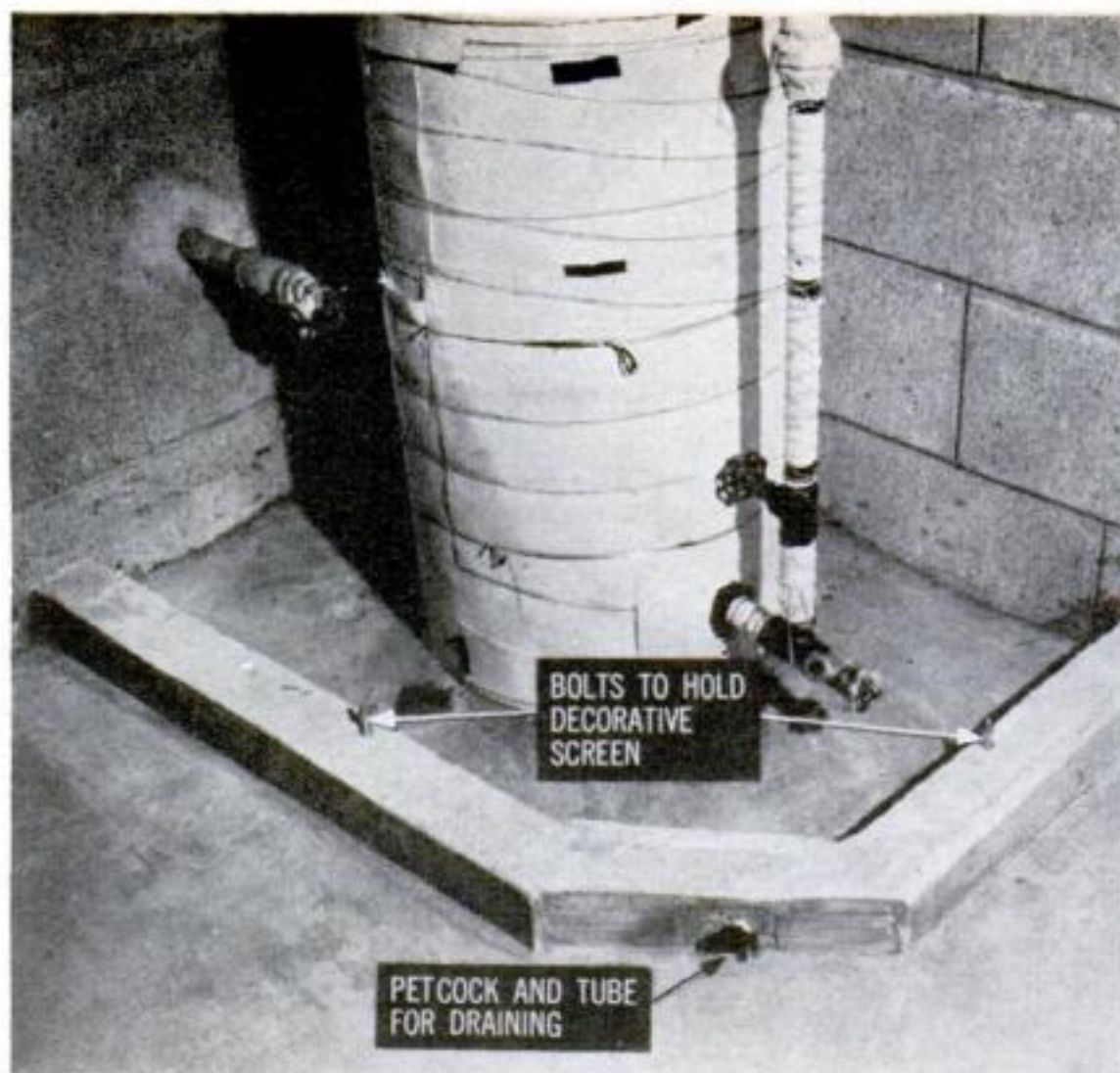


## Short Cuts and Tips

FROM PS READERS

### Dam to Keep Basement Dry

MY WELL-WATER tank, even when wrapped, continued dripping. I couldn't tile my basement floor until I solved the problem. A concrete wall, 3" high and 3½" wide, now blocks off the corner. Bolts embedded in the dam hold a decorative screen. A brass radiator petcock soldered to a ½" copper pipe running through the wall handles drainage. —C. Leino, New Berlin, Wis.

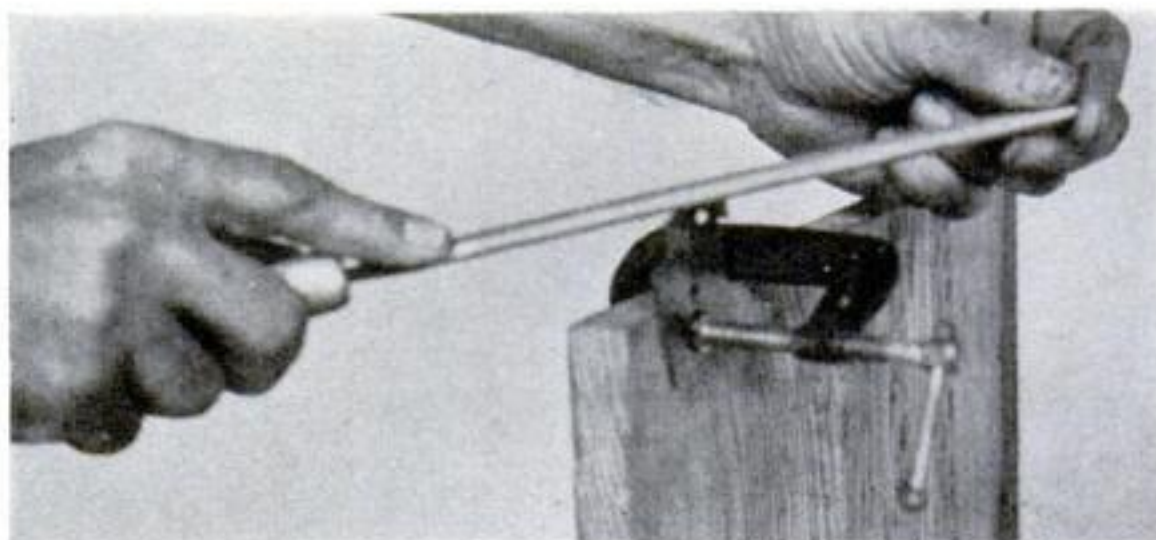


### Restoring Scratch Protection

WHEN the rubber feet or felt pads on articles like desk lamps, book ends, clocks or radios have worn away, this protection for finished surfaces can be restored by cementing a piece of inner tube or rubber rug cushion to the base. Allow cement to set and trim around the edge with a sharp knife. —H. M. Hughes, Inglewood, Cal.

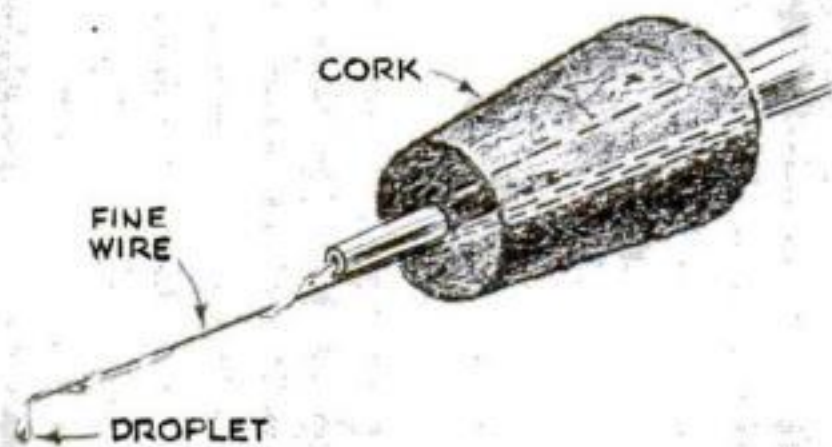
### C Clamp with a Vise Grip

A C CLAMP and a steady support can be a handy substitute for a vise. Portable and easy to use, the clamp will hold your work rigidly for filing or fabricating. A small one can be carried in your pocket. —Michael Ligocki, Gary, Ind.



### Oil for Hard-to-Reach Spots

IF OILING is a tight squeeze, try this trick. Force a bottle cork down over the oil-can spout so that the spout protrudes slightly. Then stick a needle or a piece of stiff, small-gauge wire into the cork, just below the spout. You'll find that oil drops will flow neatly down the wire. —Albert Wallin, Baraga State Park, Mich.





# What You Should Know About CUT NAILS

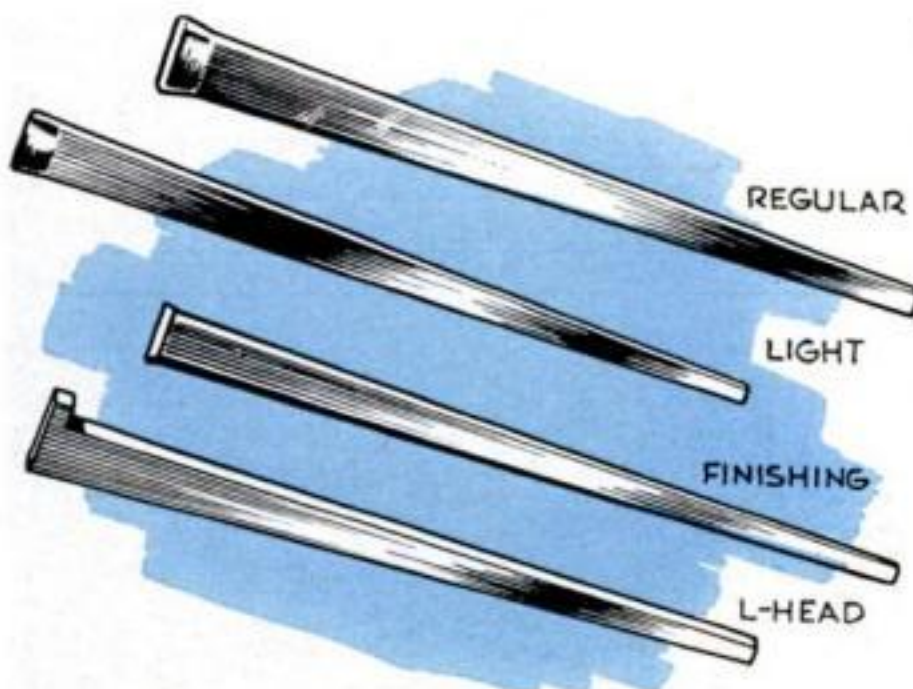
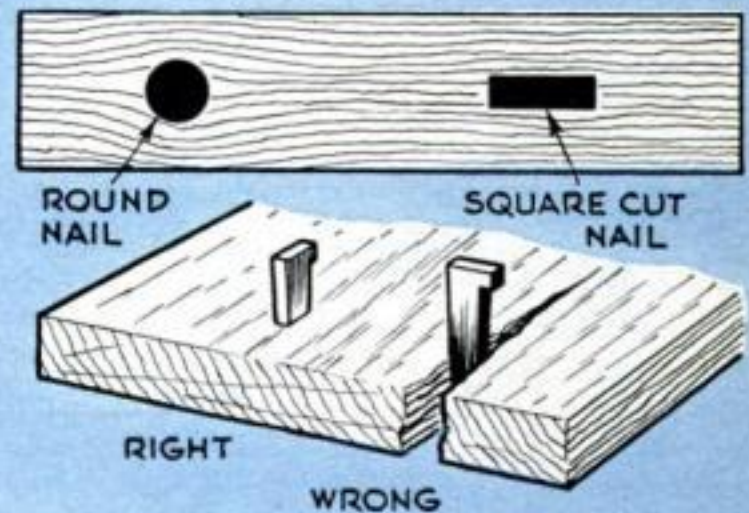
**C**UT nails are square-shaped, sharp-edged steel spikes designed to cut their way in without splitting and to give tremendous holding power. You can get them for laying flooring, fastening wood to masonry, and many other special jobs.

Did you know that the two most common types—flooring and masonry—are not at all alike but look so nearly iden-

tical that you can easily get the wrong one unless you buy carefully? Did you know that there are *four* types of flooring nails alone, that some nails come in two grades of hardness, that you can buy special spikes up to 6" long for building boats? These and other surprising facts make it pay to know how to fit the right nail to the job.

## How cut nails do their job

**THE SHARP CORNERS** of cut nails minimize splitting because they cut their way through wood, as shown at far right, instead of pushing the wood fibers apart (as pointed nails are said to do), giving the wood a chance to open up cracks. Because of their wedge shape, however, cut nails must be turned so that their long dimension runs parallel to the grain of the wood. This avoids splitting the fibers. The lower sketch at right shows the correct way to position the nail.

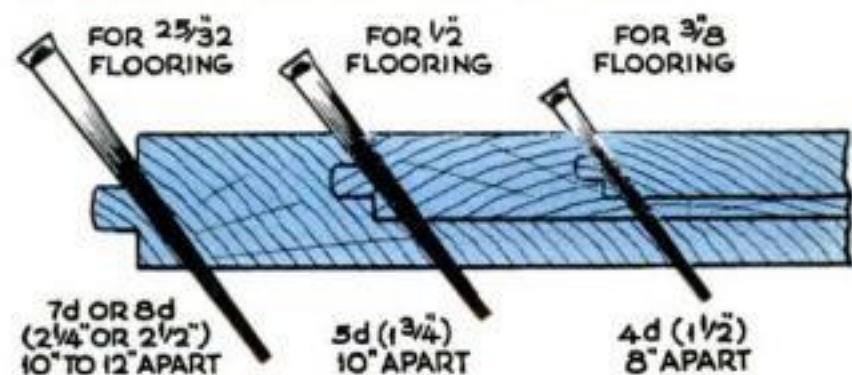


**FLOORING NAILS** come in four types, as at left. "Regular" is really a heavy-duty type used on gymnasium and other commercial floors. "Light" nail is most common for flooring in the home. "Finishing" nail—confusing because it isn't used for finish-nailing at all—is actually a lighter flooring nail. Its thinner shank is said to lessen splitting. Both "light" and "finishing" nails come in two grades of hardness—*regular* and *hardened*. Regular nails are used on softwood flooring, hardened nails on hardwood flooring. New "L-head" nail is said to hold  $2\frac{1}{2}$  times tighter without splitting because of its thin shank and broad head. Sizes of all four range from three-penny ( $1\frac{1}{4}$ " long) to 20-penny (4").

## Standard nail sizes

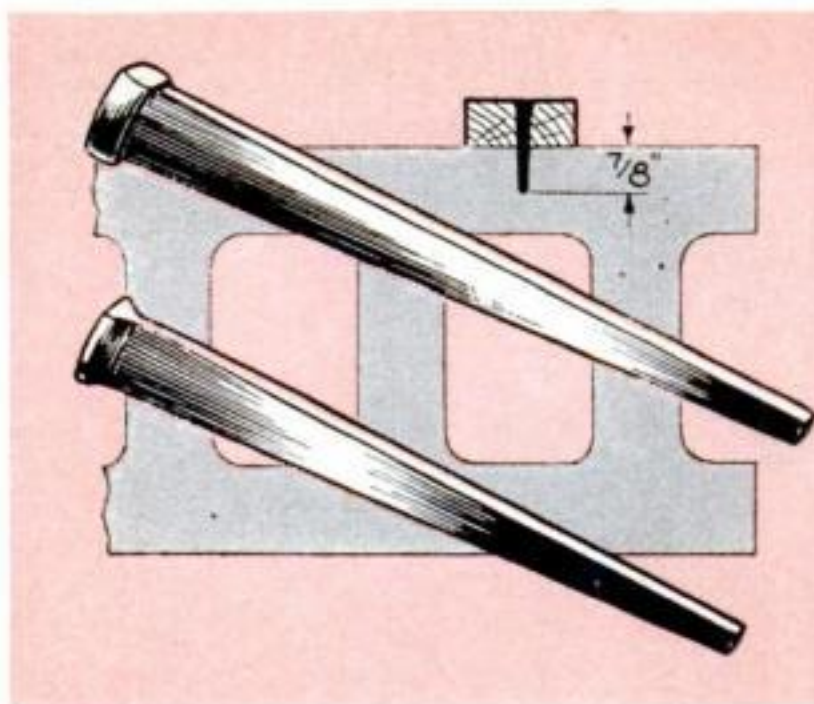
2 d ... 1"	7 d ... $2\frac{1}{4}$ "	40 d ... 5"
3 d ... $1\frac{1}{4}$ "	8 d ... $2\frac{1}{2}$ "	50 d ... $5\frac{1}{2}$ "
$3\frac{1}{2}$ d ... $1\frac{3}{8}$ "	9 d ... $2\frac{3}{4}$ "	60 d ... 6"
4 d ... $1\frac{1}{2}$ "	10 d ... 3"	70 d ... $6\frac{1}{2}$ "
$4\frac{1}{2}$ d ... $1\frac{5}{8}$ "	12 d ... $3\frac{1}{4}$ "	80 d ... 7"
5 d ... $1\frac{3}{4}$ "	16 d ... $3\frac{1}{2}$ "	90 d ... $7\frac{1}{2}$ "
6 d ... 2"	20 d ... 4"	100 d ... 8"
	30 d ... $4\frac{1}{2}$ "	

## What sizes to use where



CONTINUED





**MASONRY NAILS** are specially hardened so they can be driven into masonry without bending, as flooring nails may do if used by mistake. "Furring" type is made for fastening wood furring strips to concrete-block walls. "Cornice" type with large head is used where cornices and wood trim must be attached directly to masonry. Masonry nails should be just  $\frac{7}{8}$ " longer than wood is thick, as shown in the sketch at left. This gives the nail maximum holding power without chipping out the inside of the block. Sizes for furring nails range from four-penny ( $1\frac{1}{2}$ " ) to eight-penny ( $2\frac{1}{2}$ " ); for cornice nails, the range is four-penny to 20-penny (4").

### Other types of cut nails and what they're used for

Not all of the nails shown in the chart below are commonly available, but they can usually be obtained through lumberyards and building-supply houses. For large jobs, they can be purchased in 100-pound kegs. The examples shown here are La Belle cut nails, made by the Wheeling Corrugating Co., Wheeling, W. Va.



**BOAT NAILS** come in unusually long lengths (up to 6") and offer an easy way of spiking together simple, yet sturdy, wood boats, such as rowboats and skiffs. Smallest size is  $1\frac{1}{2}$ ".

**HINGE NAIL** has a broad round head and is made for spiking heavy strap hinges to fence posts. It can also be used as a clinch nail where the point is bent over, and for this reason is made of soft carbon steel. Sizes are  $1\frac{1}{2}$ " to 4".

**FENCE NAIL** has a very heavy body and is made especially for securing wood fence rails to hardwood posts. It can also be used for spiking heavy planks and timbers. Sizes range from five-penny ( $1\frac{3}{4}$ " long) to 20-penny (4").

**COMMON NAIL** is equivalent to similar sizes of common wire nails and is used for the same general construction jobs. A hardened version is sometimes used to attach furring strips to concrete block, although it is generally better to use a furring nail for this. Sizes are  $1\frac{1}{4}$ " to 6".

**BOX NAIL** is the same style as the common nail but slightly thinner. It is used on general construction, especially where it is important to minimize splitting. Sizes range from three-penny ( $1\frac{1}{4}$ " long) to 20-penny (4").

**SHINGLE NAIL** has a large flat head made for holding down wood and composition shingles, and is galvanized to prevent rust. It is also known as a "roofing" nail and can be used to put down roll roofing. Sizes range from 3½-penny ( $1\frac{3}{8}$ " long) to seven-penny ( $2\frac{1}{4}$ " long).

**SIDING NAIL**, made for attaching house siding over sheathing, is specially hot-galvanized to prevent rust stains from running down the walls. Sizes are 2" to 3".

**FINE FINISHING NAIL** is not the same as the regular finishing nail made for laying flooring. It is thinner and can be used wherever a slim, lightweight nail is required. Sizes range from three-penny ( $1\frac{1}{4}$ " ) to 20-penny (4").

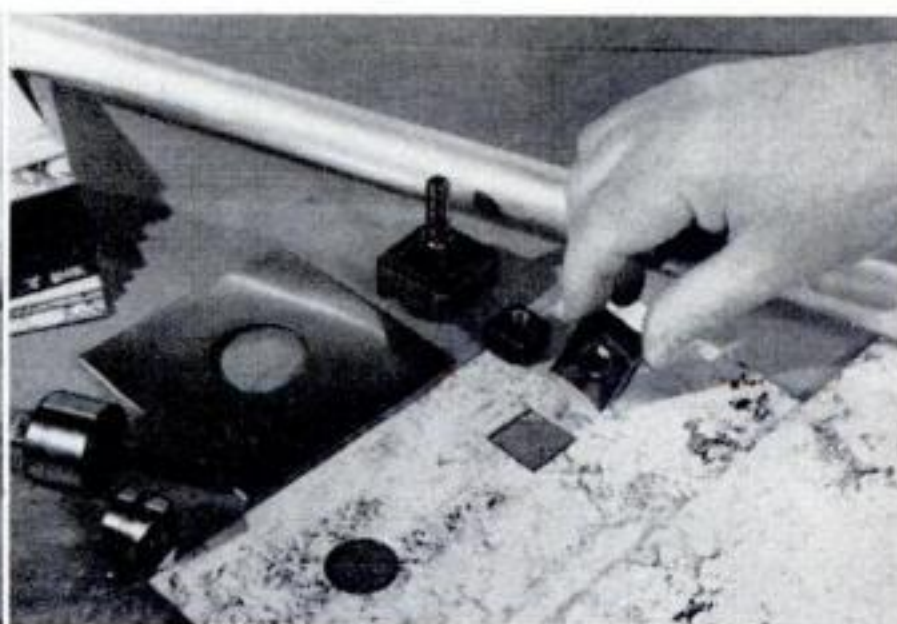


# Tips on Laying Resilient Tile

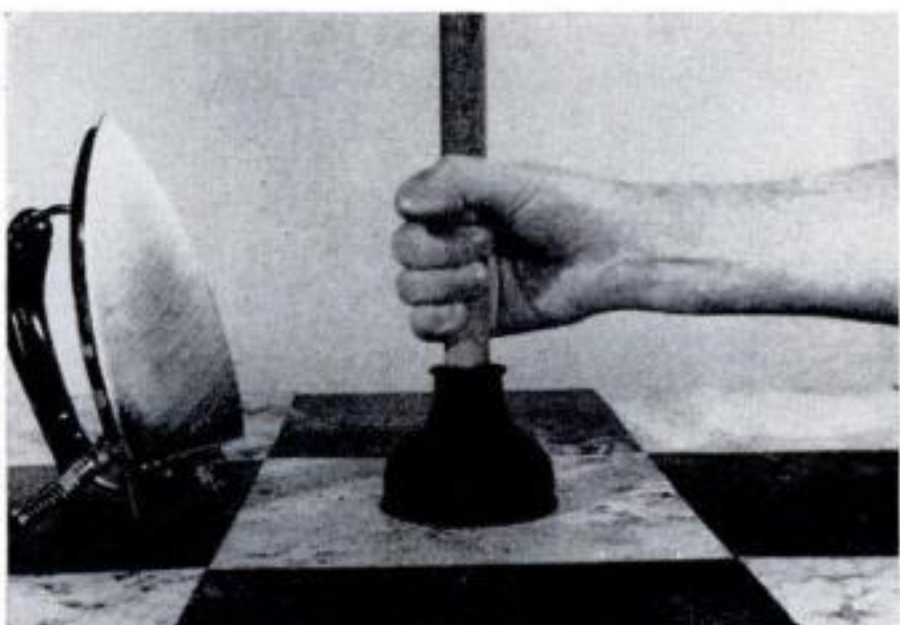
know-how  
file



**PROTECT THE FACE** of tiles from adhesive stains during installation by wiping on a thin coat of wax first. Then troublesome spills and squeeze-outs can be wiped off the surface easily.



**CHASSIS PUNCHES** borrowed from a radio repairman cut neat pipe holes through tile that's warmed. Slit the punched tile from the hole to an edge so you can slip it around the pipe.



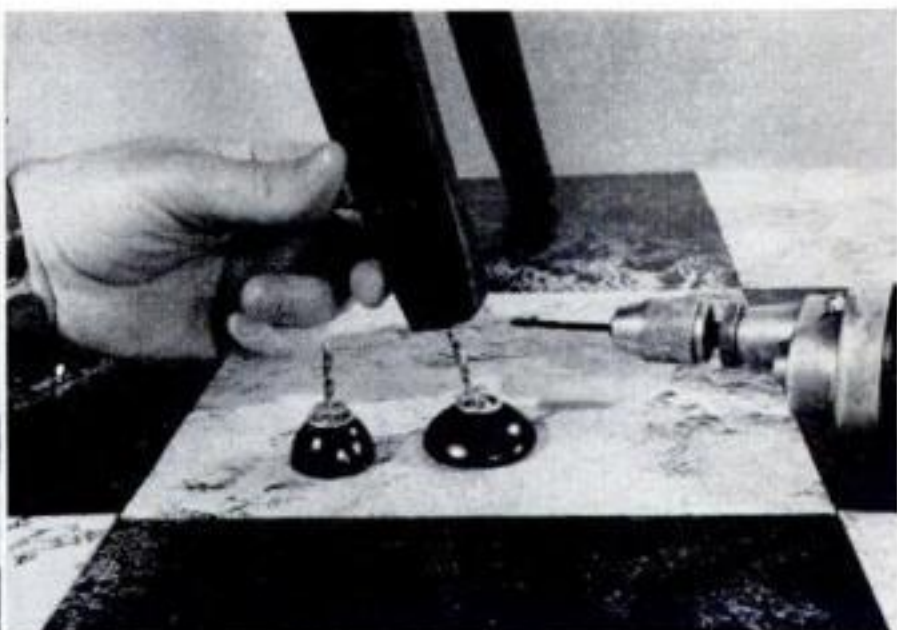
**FAULTY TILES** in a finished floor can be replaced. Warm a damaged, unevenly laid, or mismatched one with an iron and pull it up with a suction cup that's been dipped in soapy water.



**FINISH THE JOB PERFECTLY** by filling any accidental nicks or dents. The filler is made of tile filings mixed with wax. Force this "putty" into the hole. Then clean face of the tile.



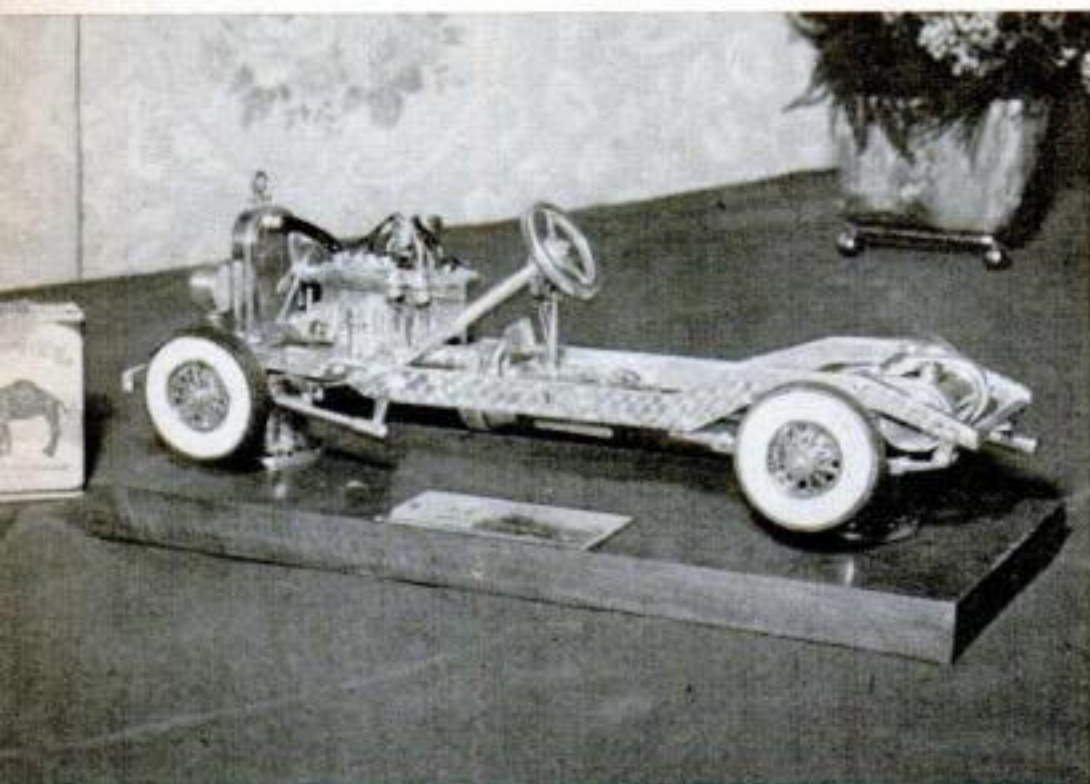
**LET CEMENT DRY** two days before waxing tile. Paint roller with broomstick handle eases application. On asphalt, rubber, or cork tile, use water-soluble wax. Use no wax on vinyl.



**AVOID FUTURE DENTS** by attaching broad plastic rests to all furniture legs—they spread the weight better. Predrill a hole for the screw kind; a snap-in type is made for metal legs.



# My PRIZE project is ...



## ...a classic car chassis

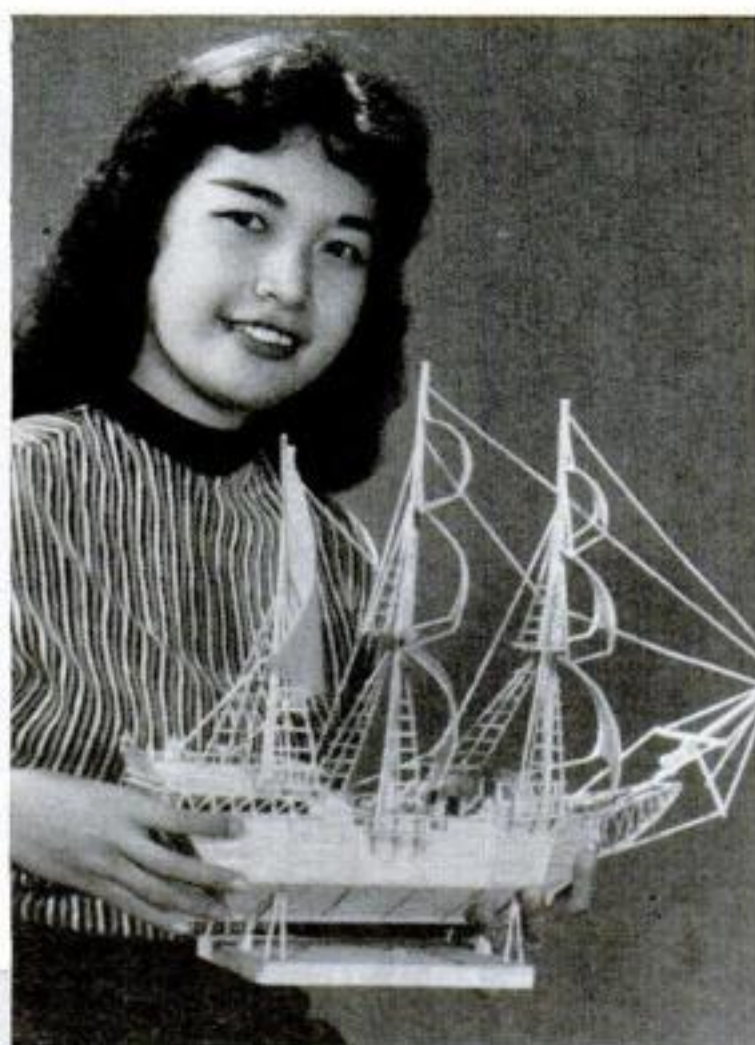
THE wheels turn and the steering gear operates on this scale model of a Stutz Black Hawk chassis. I made it of aluminum and mounted it on a mahogany base. The cigarette pack shows how big it is. The engine is a dummy, but like the rest of the chassis, it's accurately detailed.

A. E. LOEHR, Belvedere, Ill.

## ...a ship model

It's made from matches. I cut off the heads and cemented the sticks together, one by one. After I'd completely formed the model, I sanded it smooth. The job took about 20,000 matches and eight months of spare time. It placed third in the arts and crafts contest for Filipinos held at Clark Air Force Base. In the picture, my friend is holding the model. Nice, isn't she?

C. P. TRIAS, Rosario, Cavite, P. I.



## ...a pool table

It's complete with ball rack and triangle. I designed and built the whole outfit myself—except for the cues and balls—when I was 16. The sides are walnut-finished pine, and the top is felt-covered hardboard. That's me making a shot while brother Blaine looks on.

RICHARD ANDERSON  
Friend, Neb.





## Short Cuts and Tips

FROM PS READERS

### Stand-Up Magnifying Glass

BOTH hands are left free when a hand magnifier is equipped with this simple support. Form it from stiff wire and bend the ends at an angle so that they can be pushed into a hole drilled in the handle.—*Ken Murray, Colon, Mich.*

▶▶▶DON'T throw away that old dried putty in the bottom of the can. Drain off any oil, remove the putty, and place it on a hard board. Then beat the lump with a hammer, adding a little oil gradually.—*Donald H. Walton, High Point, N. C.*

### Converting Flash to Spotlight

TO AVOID light spread when you use a flash extension for backlighting, turn it into a spot. Cut a piece of thin hardboard to fit the reflector and insert an empty fruit-juice can into a center hole. Paint the inside of the can black. Two screws with nuts and washers, near opposite edges of the disk, permit temporary attachment. Just slip the washers over the reflector.—*C. Martin, Detroit.*



### Chisel-Chip Safeguard

PROTECT yourself against flying chips when you use a chisel, by slipping the tool through a hole in a square of wire screen. Anchor the screen to the chisel with a pair of tight-fitting rubber washers cut from an old inner tube.—*Leslie K. Schultz, Berwyn, Ill.*

▶▶▶THE average home owner may not have a suitable container to mix mortar. I solved the problem by using a garbage-can lid. It held water without spilling, and was easily moved from sandpile to working area. A little water after the job, and the lid was as clean as ever.—*Arthur J. Harris, Baton Rouge, La.*





**Trouble-shooting adventures from the notebook  
of a repairman, or—**

# The Case of the Yellow TV Coil

By Art Margolis

*Some day I'm going to write a book about the characters I've met in my work. They're about as varied as the TV troubles I'm called to fix. I thumbed through my notebook the other day and selected two cases at random. Here they are:*

THE modern house was mostly glass. I pushed my hat back on my head and looked for a door. In the middle of one opaque panel hung a metal object the shape of a human ear. On the chance that it might be a knocker, I lifted it.

Chimes sounded inside and a voice came out of nowhere. "Who's there? Speak into the ear, please. It's a microphone."

"TV man," I said, keeping my voice normal. The panel slid aside, revealing a bearded man wearing a white artist's smock and beret to match, and holding a foot-long cigarette holder in one hand.

As the door closed itself behind me, he crooked a finger to indicate that I was to follow him. I'll skip the furnishings because describing an abstract nightmare is beyond my ability. We entered a

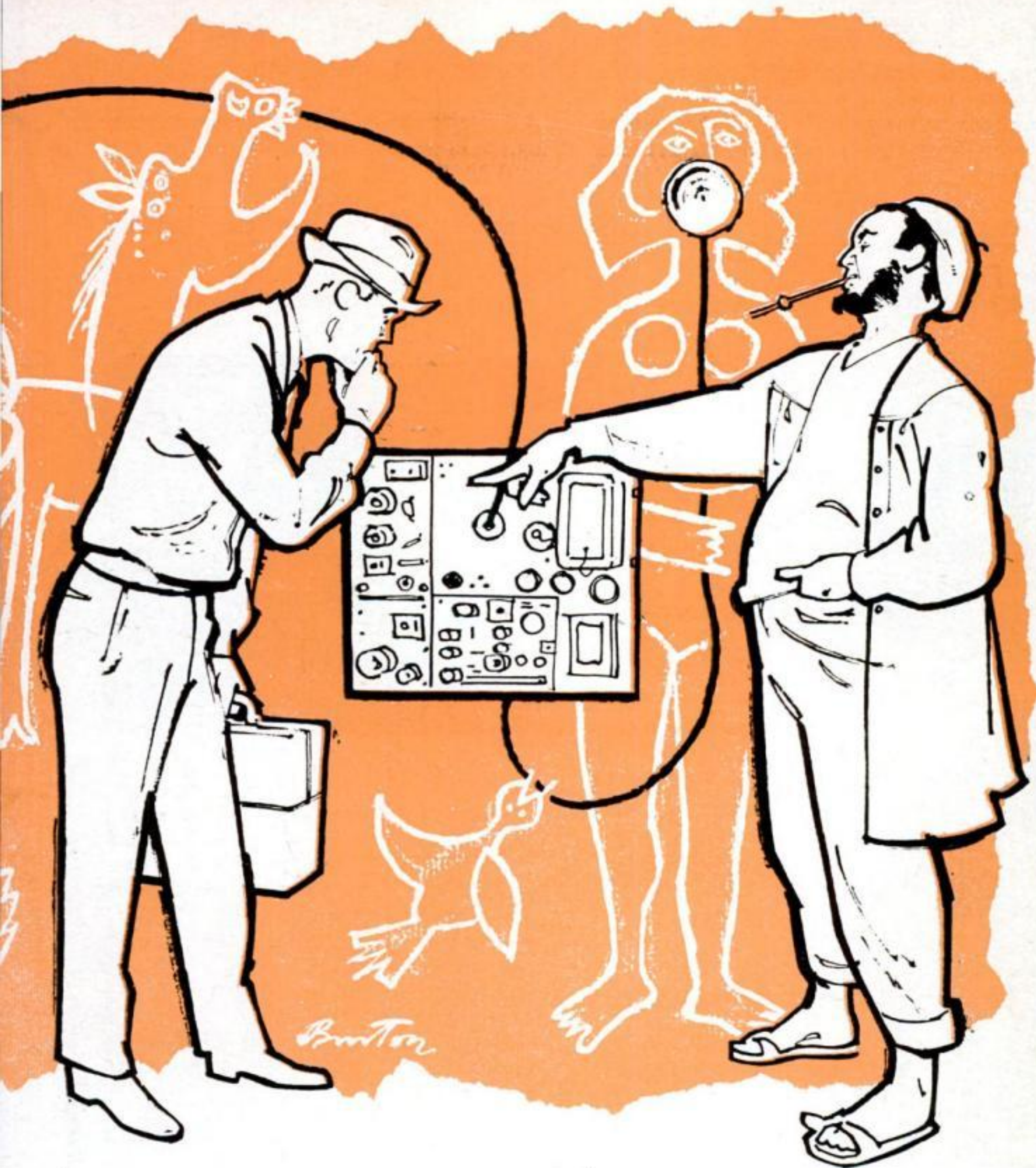
*He waved my objection aside with an imperious gesture. "Change it!" he said.*

smaller room where I was faced with a wall that made me gasp. I did a double-take. What at first had appeared to be a mixed-up mural resolved itself into a crazy TV set. The picture tube was in one corner. The printed-circuit chassis was placed vertically dead center. Tubes pointed out at me.

"How do you turn this thing on?" I asked.







"Never mind that," said the bearded man. He went over and pointed to the horizontal oscillator coil. It was painted a bilious yellow. "Change it!"

I explained that I'd like to examine the set first. He waved my objections aside with an imperious gesture.

"Change it!"

"Okay, mister," I said, getting to work. "It's your set."

The coil was mounted on the printed-circuit board with four connections. In the factory these four connections are soldered simultaneously by dipping the board into liquid solder. I carry no liquid solder and only one soldering iron. My problem was how to heat all four connections at once with one iron.

The solution was simple. Taking a piece of No. 10 copper wire from my tool



box, I wrapped one end firmly around the tip of the soldering iron. The other end of the wire I formed into a loop that would touch all four connections. I plugged in the iron. It became hot, transferred heat to the wire. Then I placed the wire so that it touched all four joints. The solder melted. I tugged at the coil and it came free.

Fortunately I had a replacement coil with me. I inserted it into the holes and put a bead of solder on the four con-

nections. Sound came on fine, picture perfect.

"What was wrong with the set?" I asked.

The character in the smock was beaming. "There was no brightness," he said.

"Well," I told him, "I guess the coil replacement cured that. But how did you know what part was causing the trouble?"

"I didn't," he said. "I just had to get rid of that atrocious yellow. It clashed horribly with the decor of the room."



## The Fickle TV Fan

THE sound of shooting greeted my ears as I pulled up to the gas-station pump. I had to honk my horn three times before Hank came out.

"Sorry, Art," he said. "I was watching a Western on television and didn't see you. Fill 'er up?"

"If you can spare the time from your TV. Something new, isn't it?"

"That's right. Got it in trade for that jalopy I've been souping up."

When I'd had the free treatment that goes with a tank of gas, Hank asked me to come inside. "Want you to take a peek at the set. The audio has conked out twice this week."

It was blasting good and loud. Nothing wrong that I could see, so I told him that I'd better pull the chassis and take it along for a leisurely check. His face fell. You'd have thought I was threatening to take his best girl away.

"Have a heart, buddy. The sound only goes blooey once in a while. Can't you try and fix it here?"

"No, I can't, Hank. But if you want to help . . ."

"Sure thing, Art. Just tell me how."

I made out a chart for the five audio tubes, listing all the pin numbers and the voltages that were supposed to be on each during normal operation. Then I gave him a voltmeter. "Take readings when an audio attack comes on," I said, "and compare them with the chart."

Ten days later he called. During an attack the voltage on pin four, which was supposed to be 300 volts, had dropped to zero. I told him to wait for another attack and then measure the resistor between pin four and its voltage source. I suspected that this resistor was opening up. Hank's next report proved that it was—measuring infinite ohms. I went over and replaced the resistor.

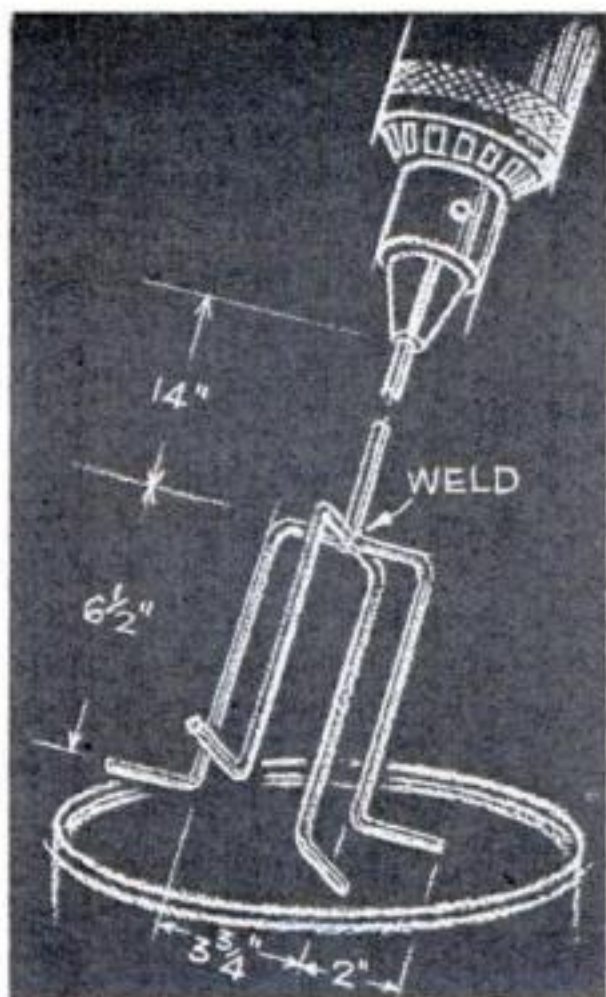
Two weeks later I pulled into the gas station to hear a racket like the firing of a machine gun. It stopped and Hank came running out from behind the office.

"Fill 'er up?" he asked.

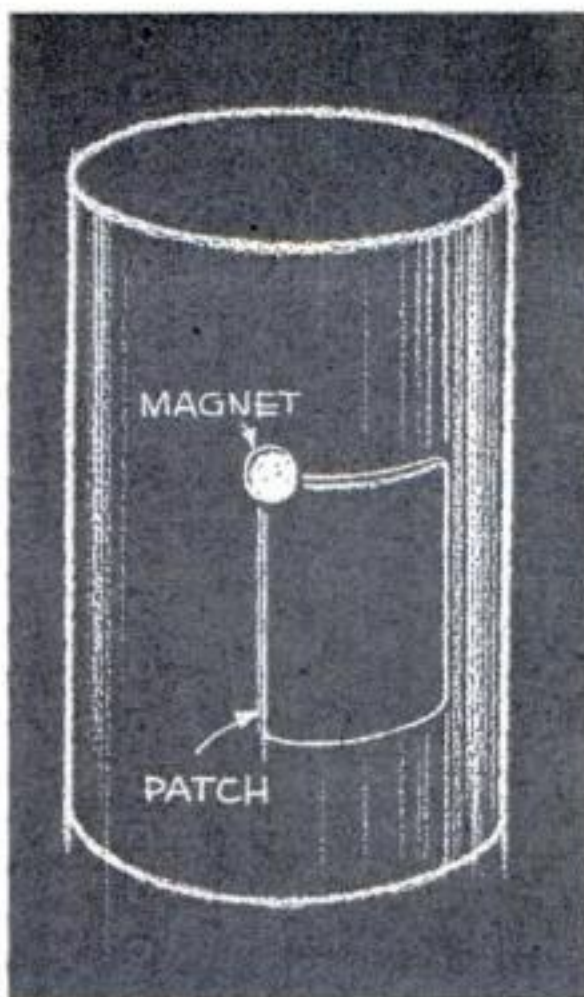
I nodded. "How's the TV behaving?"

"Don't know, Art. You see, I traded it in for an old motorcycle, and from the way she sounds I suspect . . ."





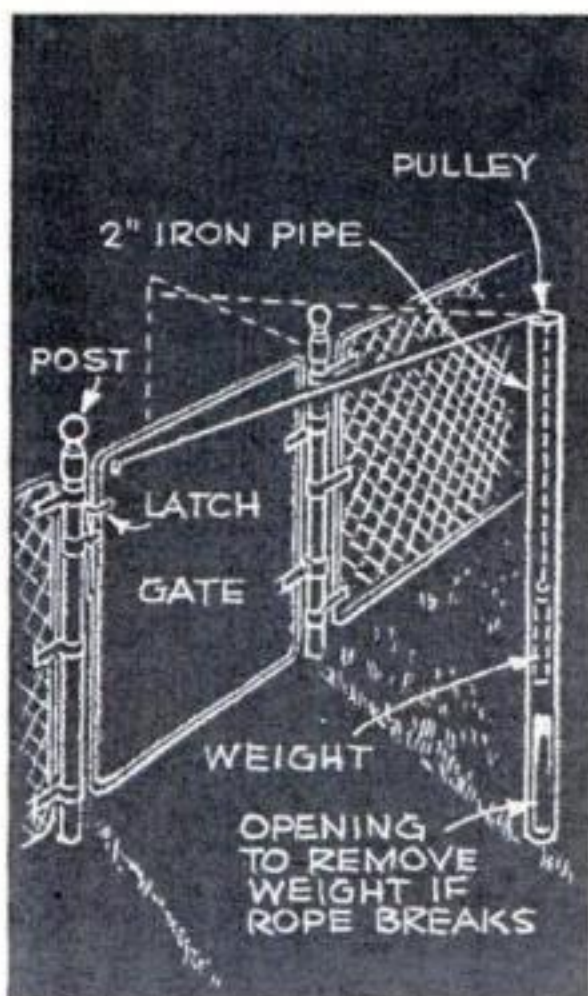
**SPEED CEMENT MIXING** with a homemade "beater." I made mine for an electric drill. It's bent to the dimensions shown from  $\frac{3}{8}$ " rod, then welded together. Chucked in a  $\frac{1}{2}$ " drill, it mixes two gallons of cement in a jiffy in a five-gallon bucket. —Jerry Thomas, Camden, Ind.



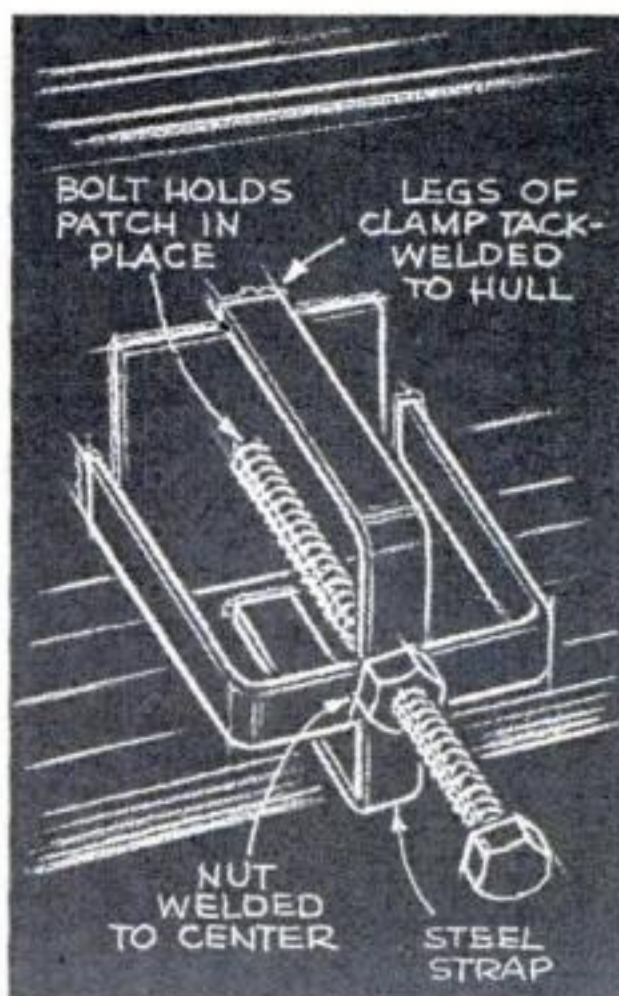
**TO HOLD A PATCH** on a vertical surface while it's being welded, I use an ordinary radio-speaker magnet of the permanent type. The magnet holds small patches securely to the surface and saves a lot of work with complicated clamp setups.—Pete Lieuwen, New Holland, S. D.



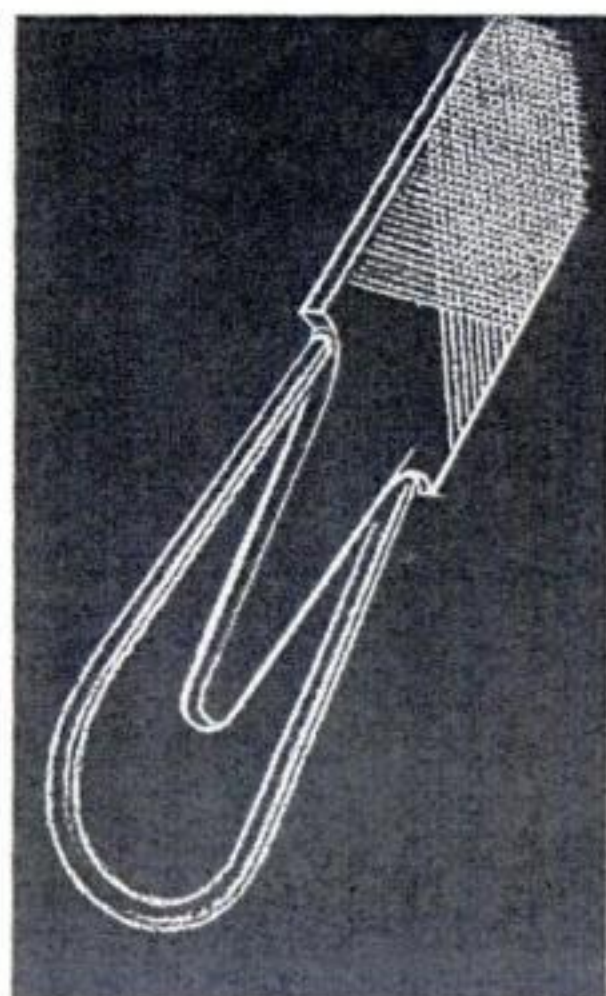
## For the Man Who Can Weld



**A SELF-CLOSING GATE** can be made with a sliding weight arranged as you see in the sketch above. I welded a pulley at the top of a 2"-pipe post. The weight rides up and down inside the pipe, pulling the gate closed as it makes the descent.—C. S. Fiduccia, Covington, La.



**REPAIRING METAL BOAT HULLS** has been much easier since I made this patch clamp. Two U-shaped pieces of strap are welded crosswise with a nut for a bolt. The clamp is tacked to the hull, then cut off after the patch is welded.—John Florence, Oswego, N. Y.

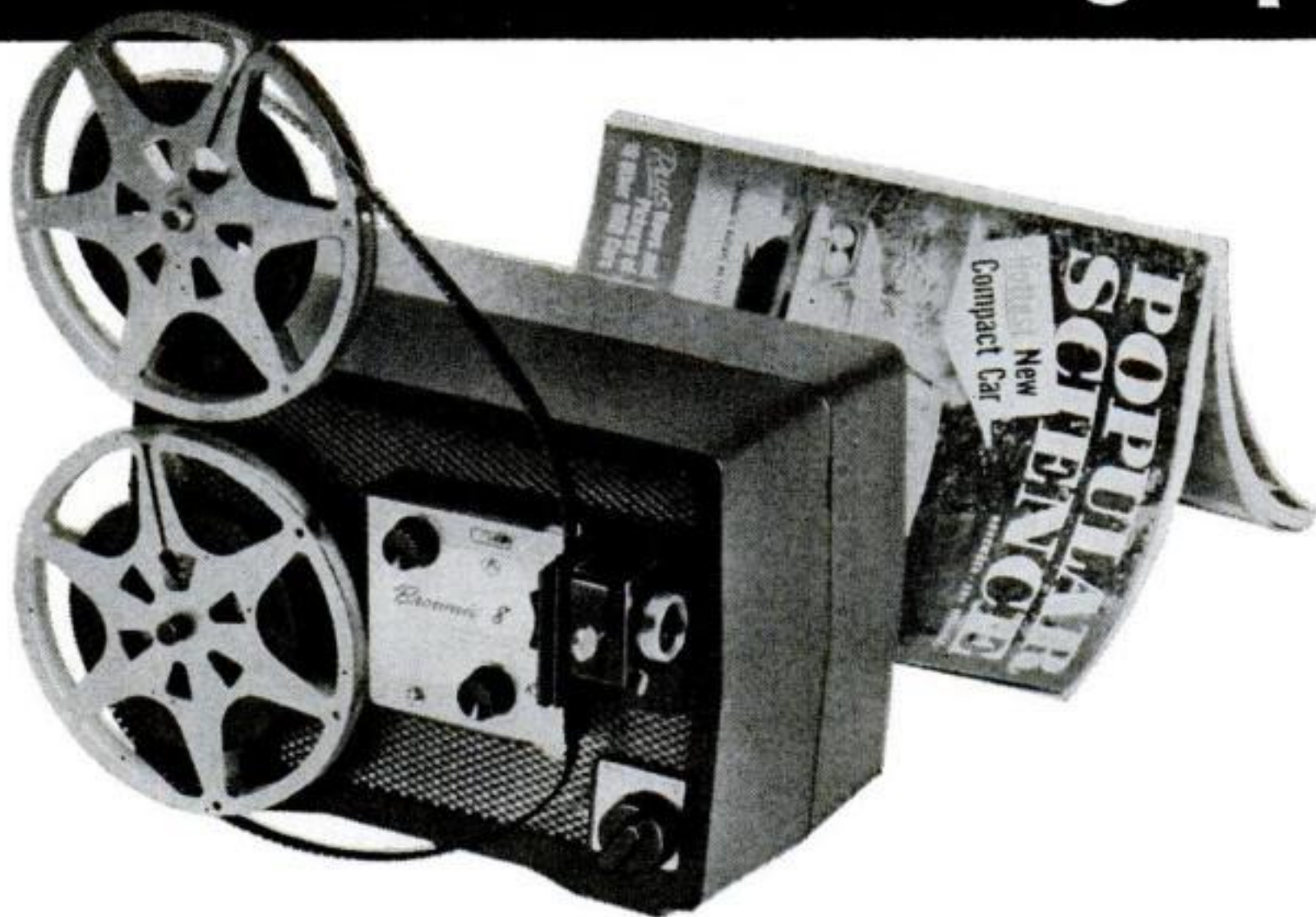


**PUT HANDLES ON YOUR FILES** by welding on loops of rod this way. They're comfortable and make it easy to hang up the files. —J. Rzeszutek, Minneapolis.

*All tips on this page were adapted from The Stabilizer, published by Lincoln Electric Company.*



# New Ideas in Photography



## Now a Movie Projector as Small as This Page

**—yet it shows beautiful movies a yard wide**

Here's the latest word in compactness for 8mm home movies. The Brownie 8 Movie Projector stands only 9" by 6½" (this page size) by 6", and weighs only 5½ pounds.

But don't let its small size fool you. It performs big in every way.

At just 12 feet from your screen, this projector shows movies three feet across. The secret is a new-type lamp with its own non-

tarnishing, electronically prefocused reflector to assure maximum brilliance.

Loading is simple because there are no sprockets. You can actually thread the film while the projector is running. The projector accepts big 200-foot reels for full 15-minute shows. And it is blower-cooled.

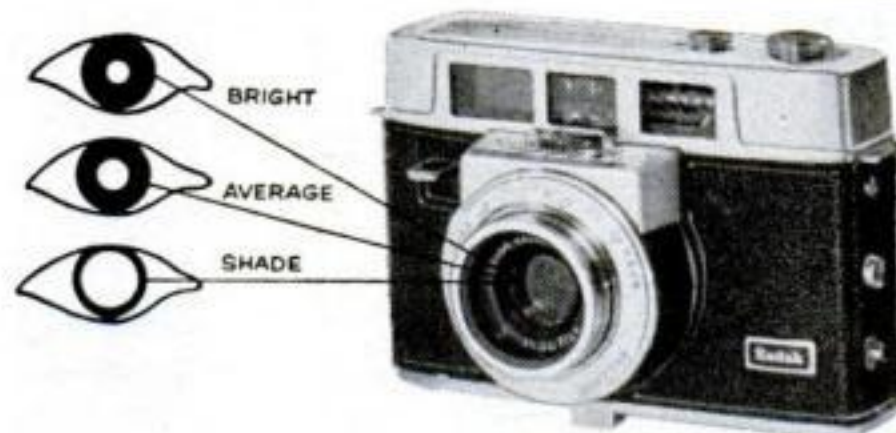
It's worth a trip to your dealer to see the Brownie 8 Movie Projector in action. The price: only \$44.50, or as little as \$4.50 down.

## Lens Automatically "Squints" in Sun, Opens in Shade Like Human Eye

Now Kodak has built an automatic 35mm camera that works much like your eye. It sees light and sets its own lens opening.

The "brain" in the Kodak Automatic 35 Camera is a photoelectric meter. Light reflected from your subject moves a control needle which determines the lens opening. The result: correctly exposed pictures time after time!

Change shutter speed, and an automatic switch adjusts the meter and lens response. If light is too dim even for the  $f/2.8$  lens, an automatic signal



tells you to use flash. You don't even thread film—just drop it in!

Try for yourself all the swift, easy operating features of this camera . . . the single-stroke film advance . . . the click-stop "zone" focusing. Only \$84.50, or \$8.50 down.



# from Kodak

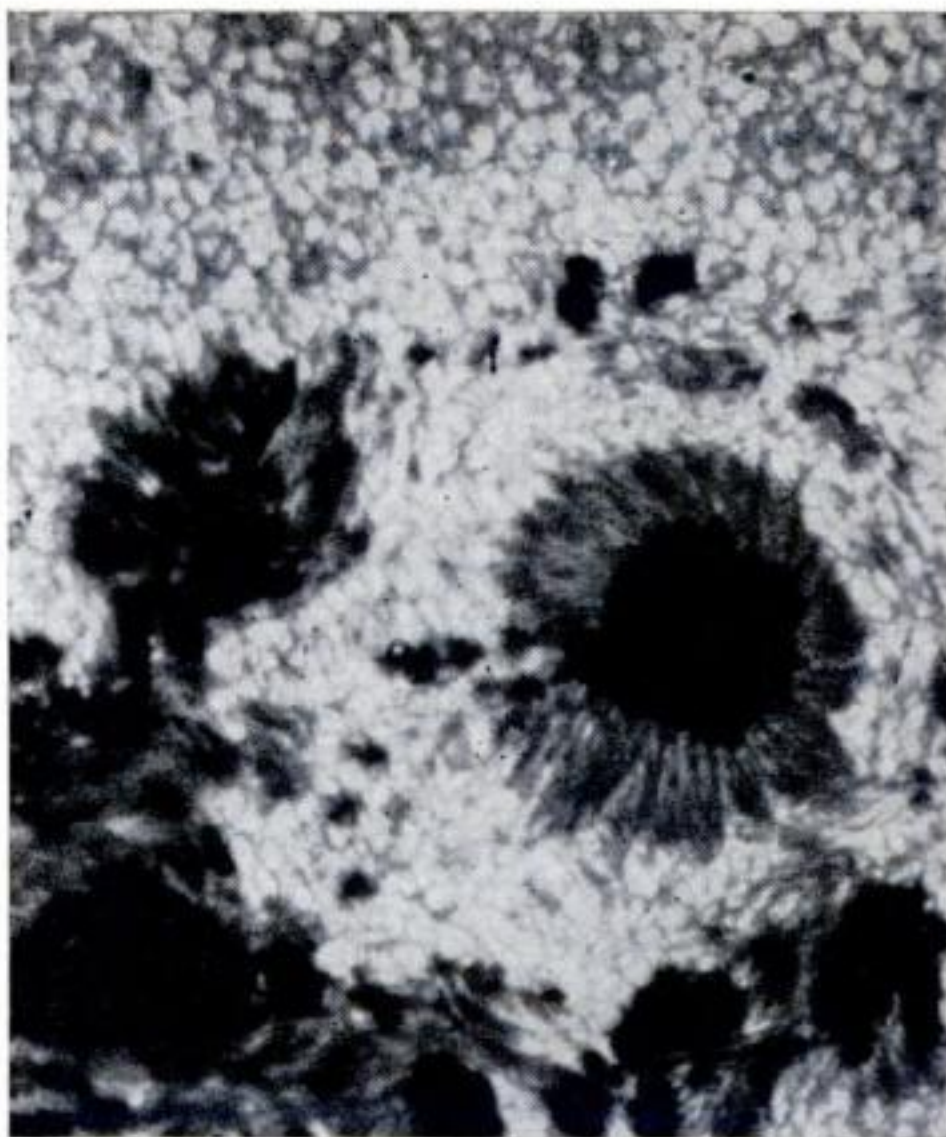
## Spots on Sun Filmed for Clues To Radio Disturbances on Earth

Film—in a giant 35mm tele-camera—is bringing astronomers new facts about how happenings on the sun affect us here on earth.

Sunspots cause interference in long-range radio communications. They are being studied through thousands of 35mm photographs of the surface of the sun—taken by a telescope-TV camera system. Kodak films designed for astronomical and professional movie work are being used.

To get the pictures, the radio-controlled photographic equipment was carried by balloon to an altitude of 80,000 feet. This eliminated the shimmer and poor visibility caused by the earth's atmosphere. As a result, the pictures are far more detailed than any ever obtained by even the most powerful ground telescopes.

And the most searching pictures were taken on Eastman Background-X Film, a close relative of the famous fine-grain Kodak Panatomic-X Film used by amateur and professional photographers.



Pictures of sunspots reveal dark cores of relatively cool gases embedded in strong magnetic fields. Surrounding the cores are wispy filaments of outward-moving warmer gases. The sunspots shown here produced a magnetic storm on earth the day before the picture-taking flight.

## Versatile Slide Projector Lets You Use Any of 3 Changer Systems

Mount and store your slides any way you want . . . choose any of three kinds of slide changers. This Kodak 300 Projector lets you build your color-slide collection without restrictions.

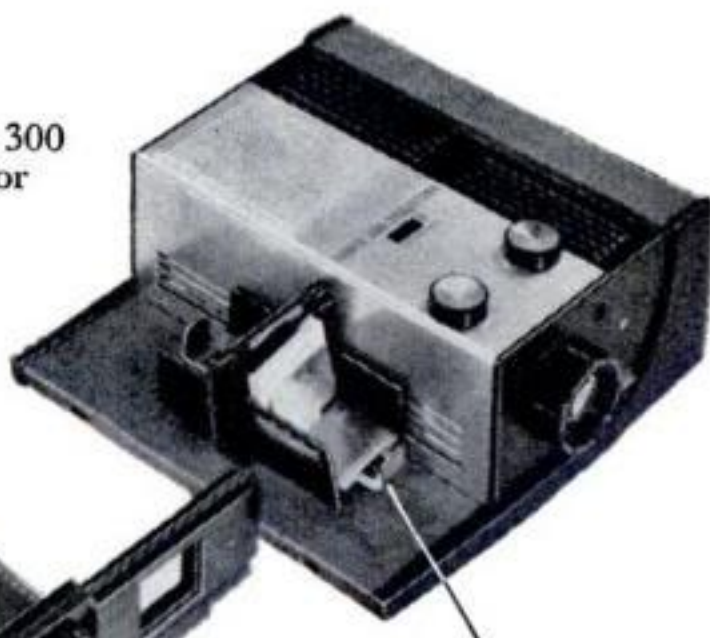
And it gives you great performance. The efficient lamp and condenser show both 35mm and super-slides brilliantly. The four-inch lens permits big-screen images even in small rooms.

A quiet, turbine-type blower pulls cool air in over your slides and around the lamp. Carrying handle is on the projector, not the cover, for extra safety. Cover snaps on—no extra carrying case to buy.

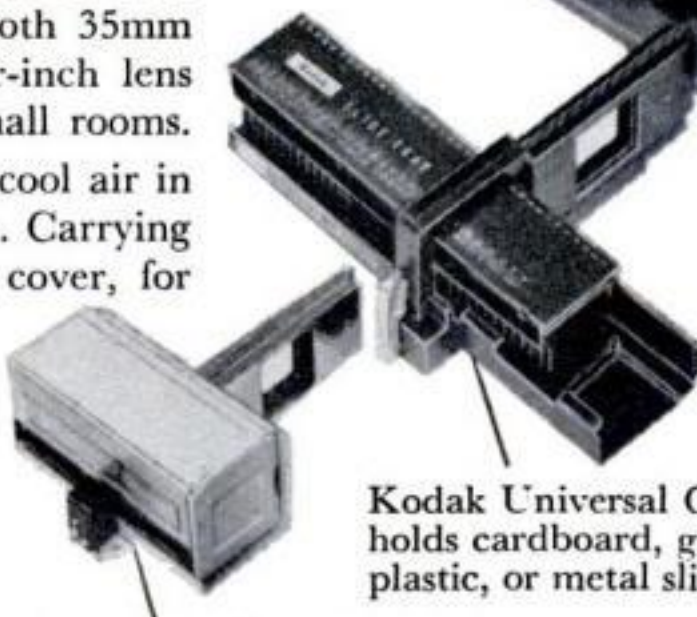
With Readymatic Changer and 4-inch lens, Kodak 300 Projector, \$64.50; Kodak 500 Projector with extra margin of brightness, \$74.50. Look at both before you choose.

*Prices are list, include Federal Tax, and are subject to change without notice.*

Kodak 300  
Projector



Kodak Readymatic  
Changer for cardboard  
mounts. Easy editing,  
stacking.



Kodak Universal Changer  
holds cardboard, glass,  
plastic, or metal slide mounts.

Automatic Magazine Changer.  
Metal frame. Takes cardboard  
mounts only. Allows indexing.

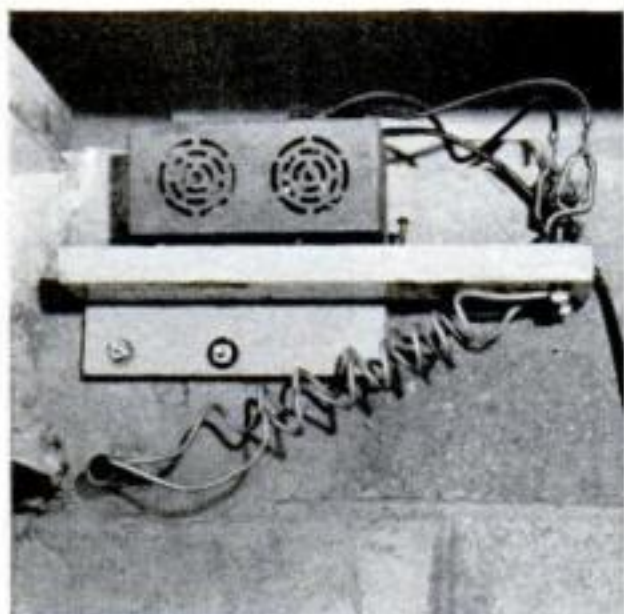
**EASTMAN KODAK COMPANY, Rochester 4, N. Y.**

SEE KODAK'S "THE ED SULLIVAN SHOW" AND "OZZIE AND HARRIET."

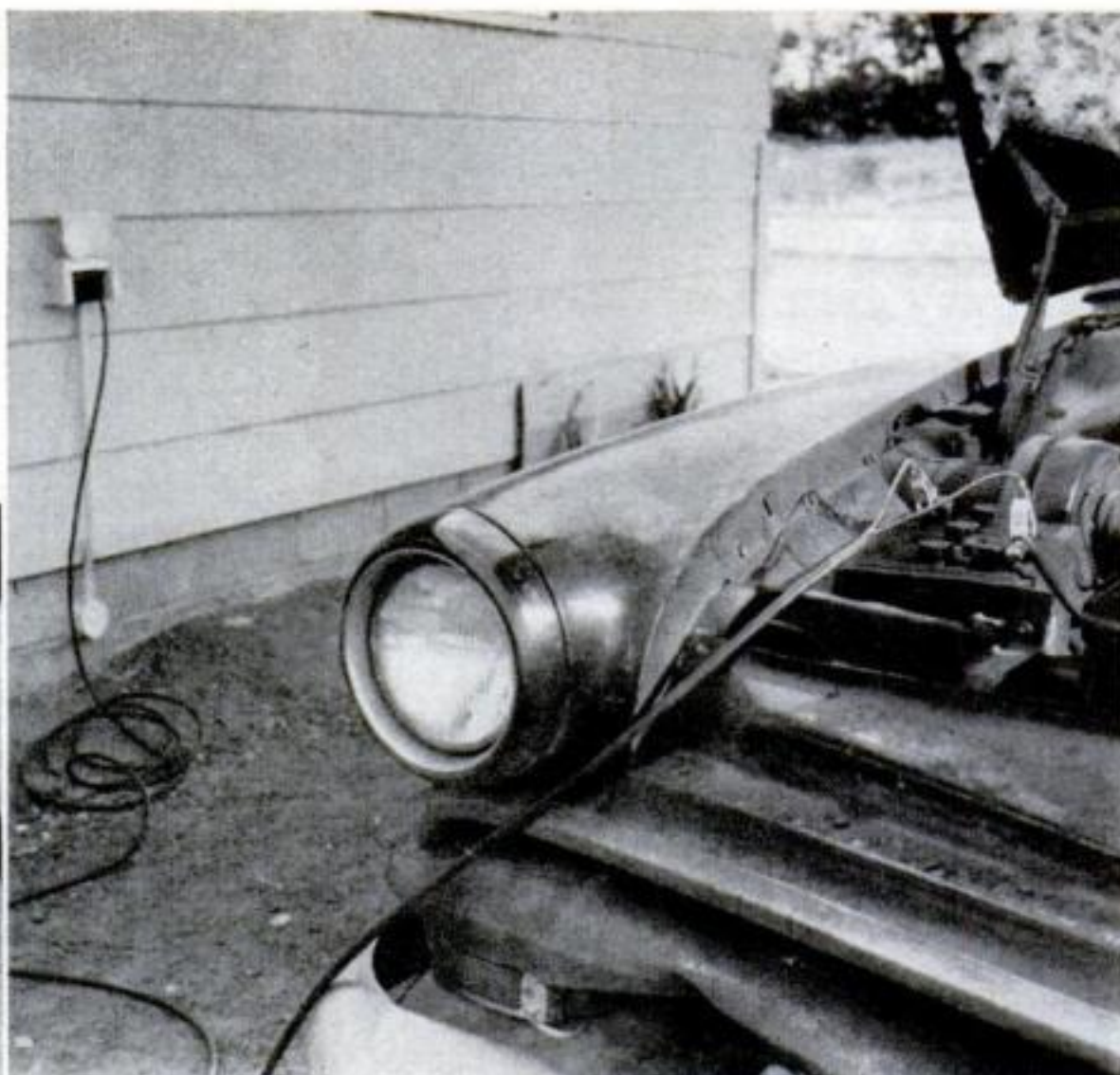
**Kodak**  
TRADEMARK



# How Two Motorists Boost Their Batteries



**SMALL BATTERY CHARGER** is out of the weather. Mounted in the basement, it is connected to a polarized outlet outside the home of Clarence



Leino. He parks his car in the open driveway and hooks up an extension between the car and the outlet box for an all-night charge.

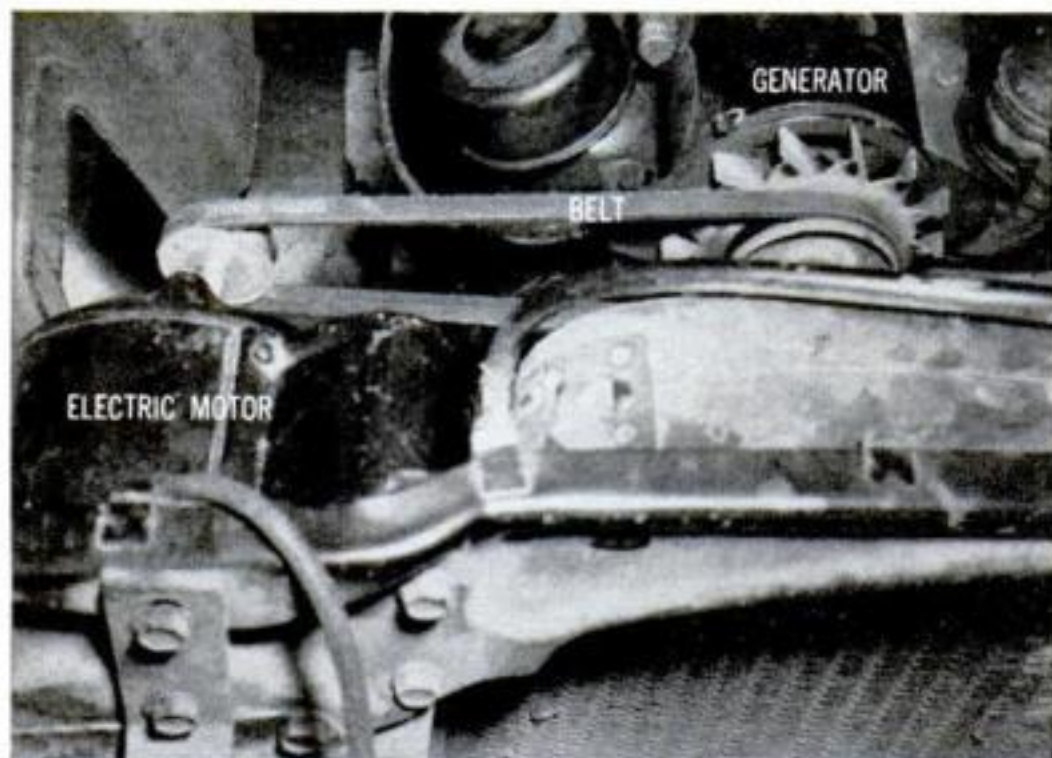
**A** BATTERY that is half charged will start your car easily in mild weather, but it loses its punch when the mercury drops below freezing.

To be sure of peak winter capacity, Clarence Leino of New Berlin, Wis., rigged a plug-in charging outlet beside the open driveway where he parks his car. When he comes home from work each

evening, he plugs in the extension wires, clamps on the battery terminals, and closes the hood. All through the night, a light trickle charge flows into the cells, filling them with energy for a fast getaway in the morning.

Besides the convenience of an easy hookup, the extension wire is safe to handle. It carries only 12 volts from a five-amp charger installed in the basement.

Lacking a battery charger, but with a spare motor lying idle, Lee Phillips of Wyandotte, Mich., maintains a full charge by driving the car's generator with the motor. He permanently installed the motor on one side of the engine compartment of his '57 Pontiac. When he feels the battery needs a boost, he disconnects the fan belt and slips on another belt between the motor and generator. Plugged into a garage outlet, the 1,725-r.p.m. motor drives the generator fast enough to put out 15 amps. When the battery comes up to full charge, the voltage regulator cuts out the generator.



**PERMANENTLY INSTALLED MOTOR** drives the generator while Lee Phillips' car stands in the garage overnight. Car's voltage regulator adjusts the charging rate to the battery's needs, cuts out when it is fully charged.

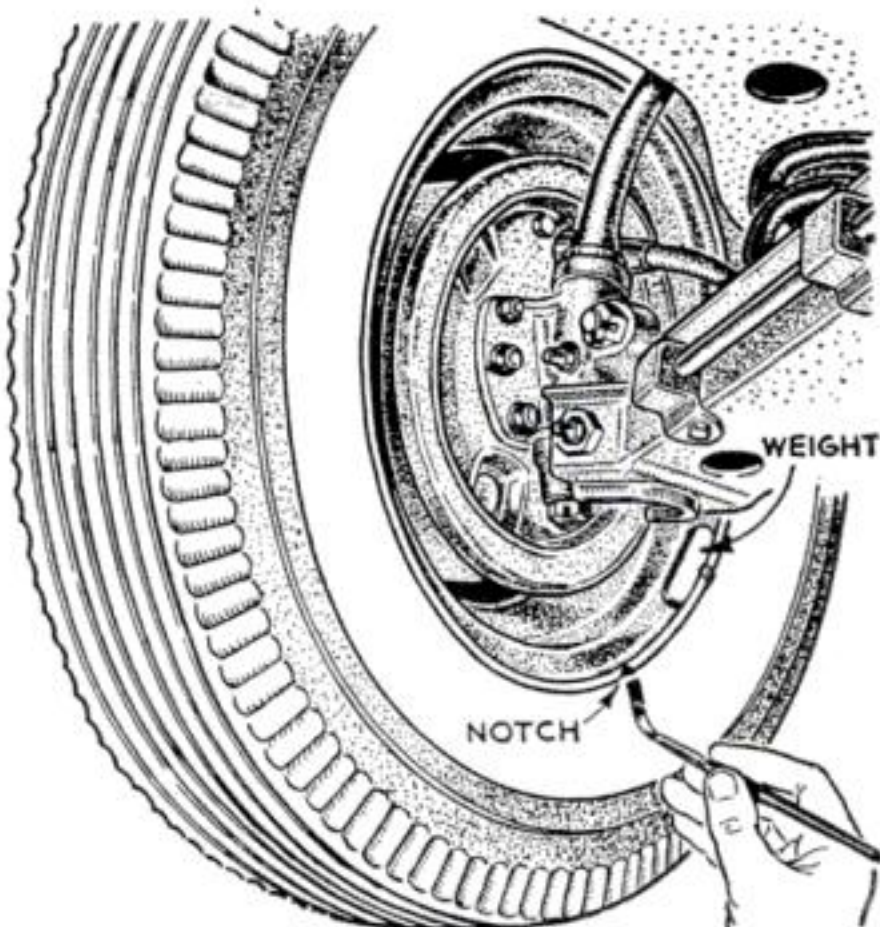




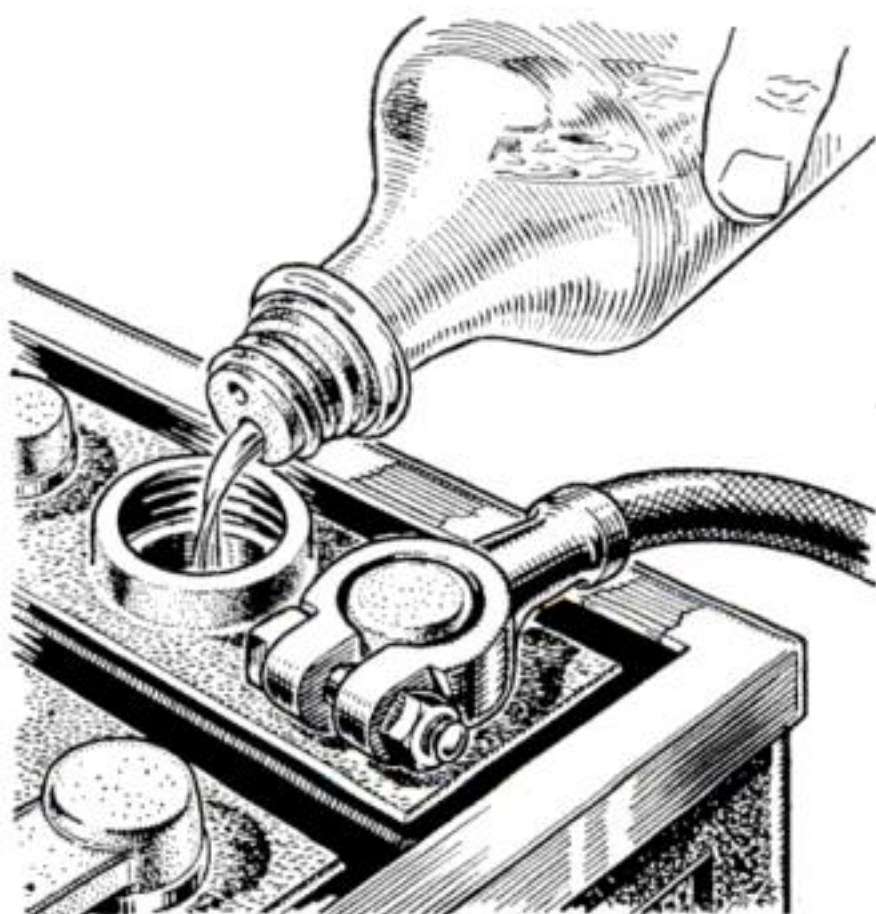
## Hints from the Model Garage



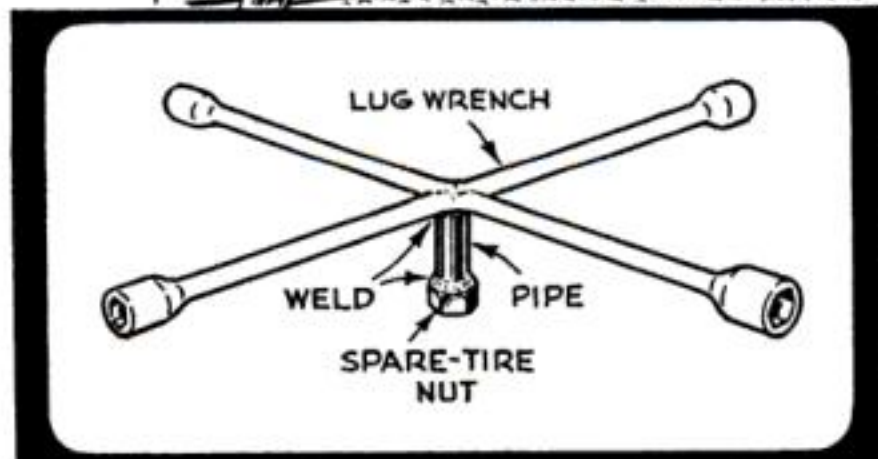
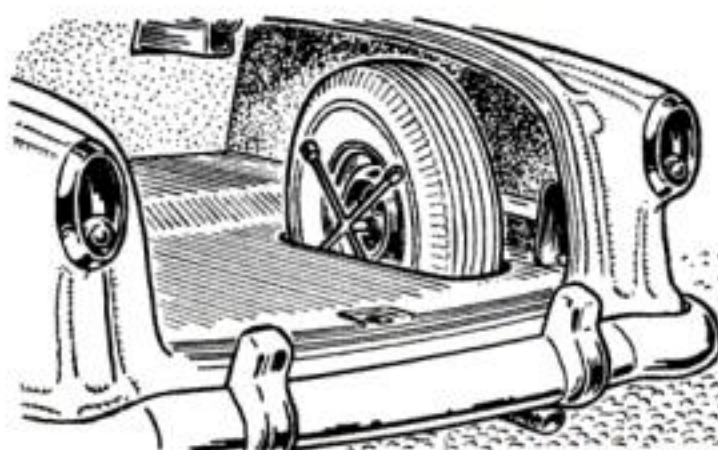
**Warning markers** for roadside repairs at night can be made from coffee cans. Fill them with sand and wrap reflector tape up the sides and across the lid. They're easy to cart in the trunk, handy to set out on any road shoulder in an emergency.



**A balanced wheel** should have its tire replaced in the same position—relative to the rim—as at the time of balancing. To assure this alignment, file a notch on the weighted rim and paint a corresponding spot or line on the inner sidewall.



**Nursing a parched battery** is a cinch if you put the distilled water in an empty pint- or quart-size ink bottle. The nonspill dispensing cap (designed for filling inkwells) lets you pour without waste just the amount your battery needs.

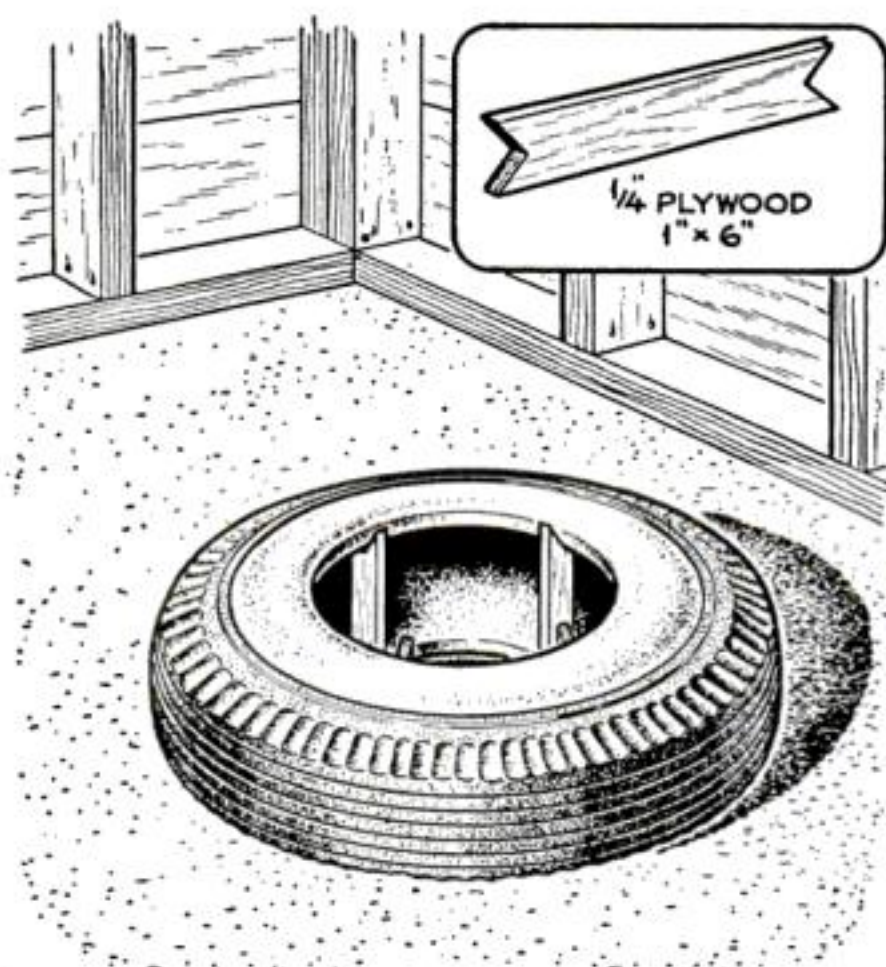


**A missing lug wrench** is an impossibility if you weld the tool to the retaining nut on your spare-tire stud. Measure outward from the nut to the plane of the tire sidewall; cut a spacer of that length from pipe with an i. d. larger than the stud.

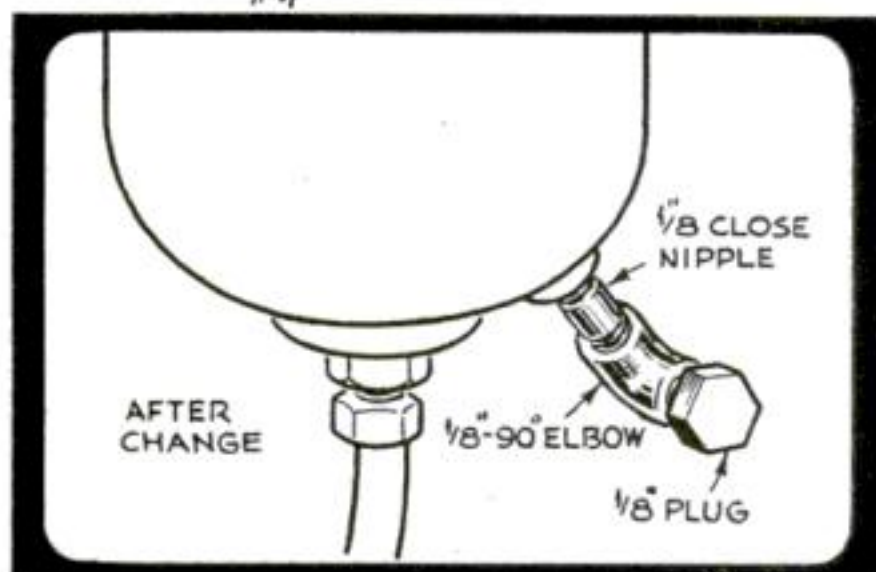
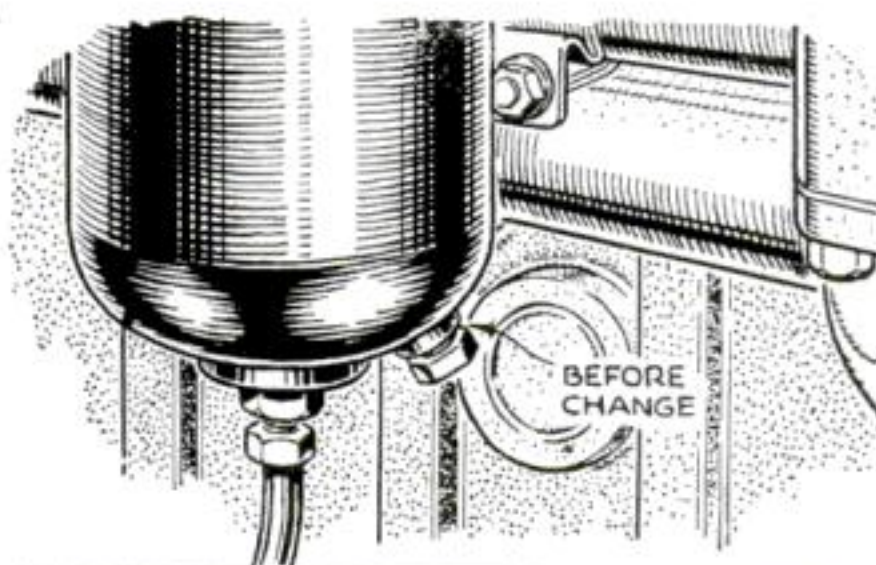
CONTINUED



## More Hints from the Model Garage



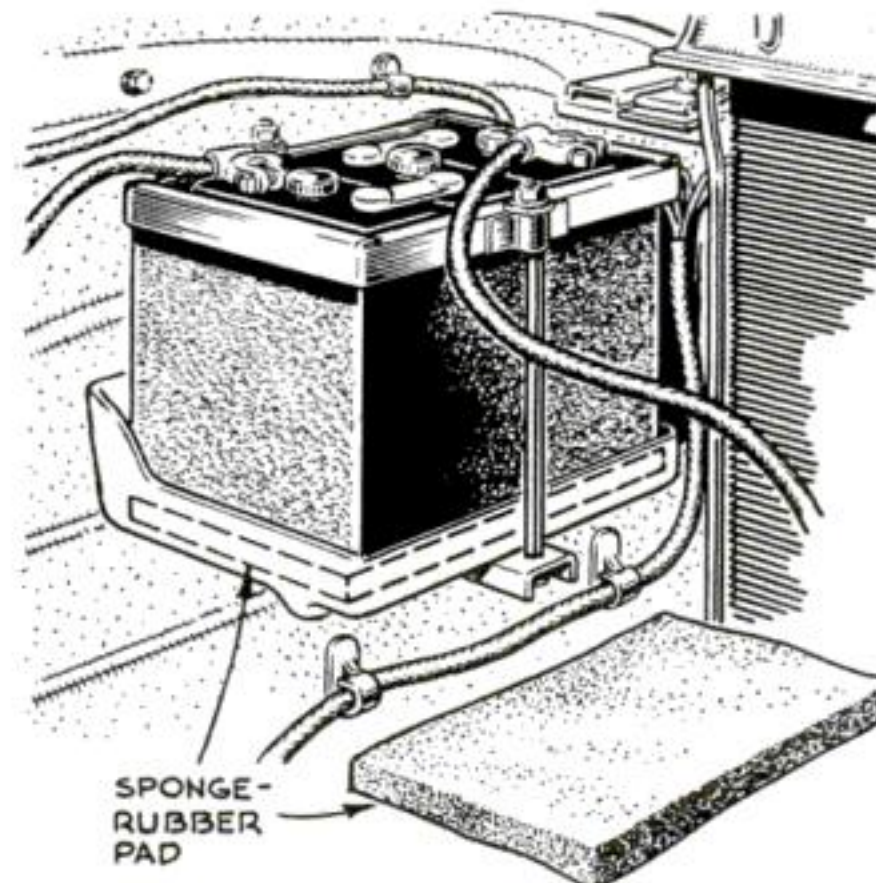
**Mounting a new tubeless tire** can be difficult when the wrappings have pressed the beads too close together to permit inflation. Let the tire stretch 10 or 15 minutes while the beads are held apart with notched spreaders of the size shown.



**Oil-filter holders** often have a small drain plug at the bottom of the case. Usually it's located so far down that it's hard to remove. To make the drain more accessible, attach a close nipple and elbow. Standard 1/8" fittings should work.



**Lift your tissue dispenser**—take it out of the glove compartment and put it where both seats have access to it. Fasten one end of a spring to the car ceiling and round the other to slip through slits at the base of the box.



**A pad of sponge rubber**, 1/4" thick, will pay dividends if placed in the tray of the battery holder before you install a new battery. It will lengthen the life of the battery by cushioning its ride, and will protect the tray from acid spills.

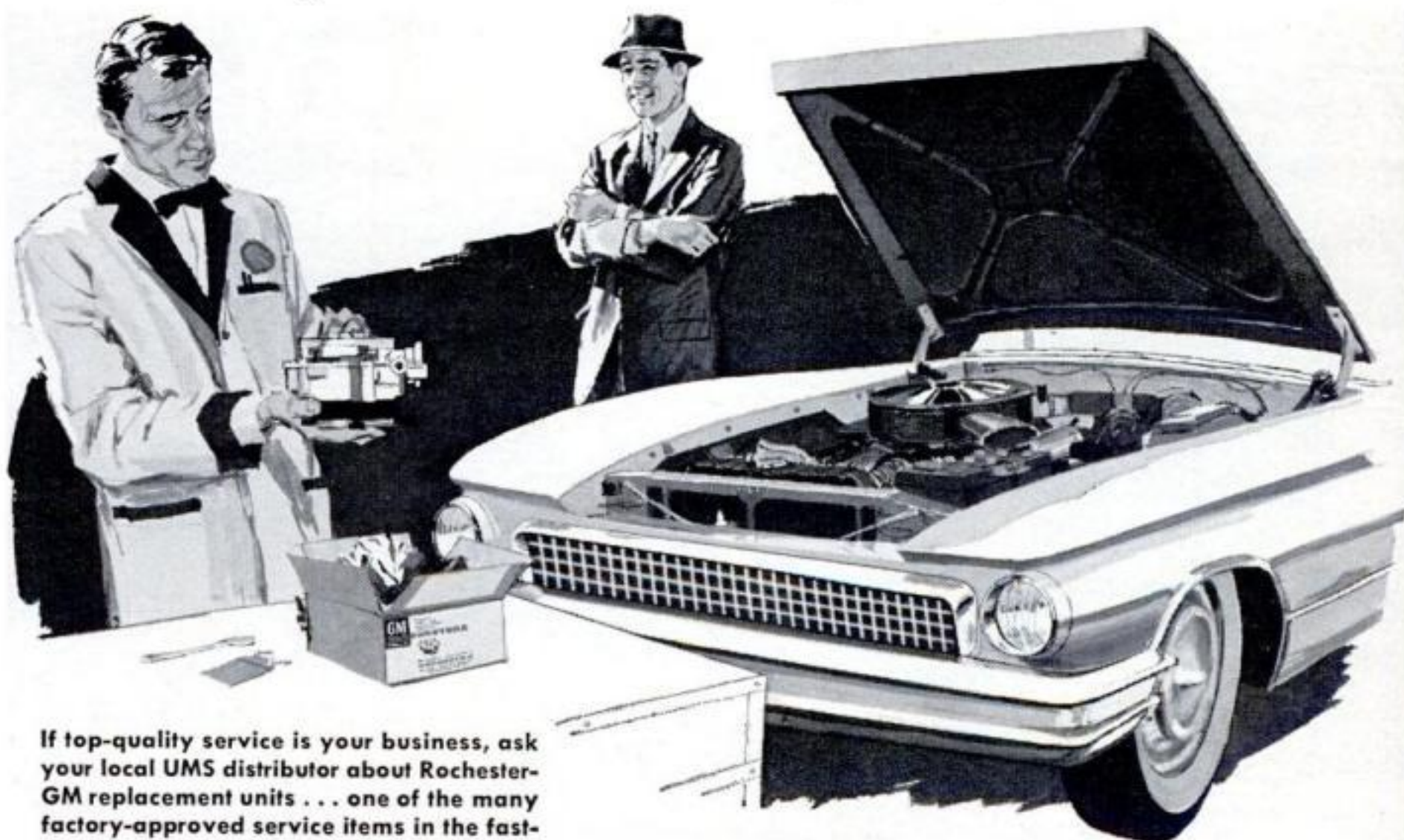


# MODERNIZE YOUR CAR'S **PERFORMANCE** WITH AN ORIGINAL EQUIPMENT CARBURETOR REPLACEMENT!

Available Now at Your Nearby Rochester-GM Carburetor Specialist's AT A NEW LOW PRICE!

When you need a replacement carburetor—see that it's a new Rochester-GM Carburetor . . . number one for original equipment. These replacement carburetors have the very latest engineering advances, giving your GM car up-to-the-minute performance. And they're at a new low price! They're engineered, manufactured and tested to the highest standards.

Rochester-GM Carburetors are original equipment on the new GM cars, including the new Corvair. Get a Rochester-GM Carburetor replacement for your GM car . . . update your performance and get new-car economy. Ask about it at your factory-trained Rochester-GM Carburetor Specialist's. *Rochester Products Division of General Motors, Rochester, New York.*



If top-quality service is your business, ask your local UMS distributor about Rochester-GM replacement units . . . one of the many factory-approved service items in the fast-moving Rochester-GM Service Line.

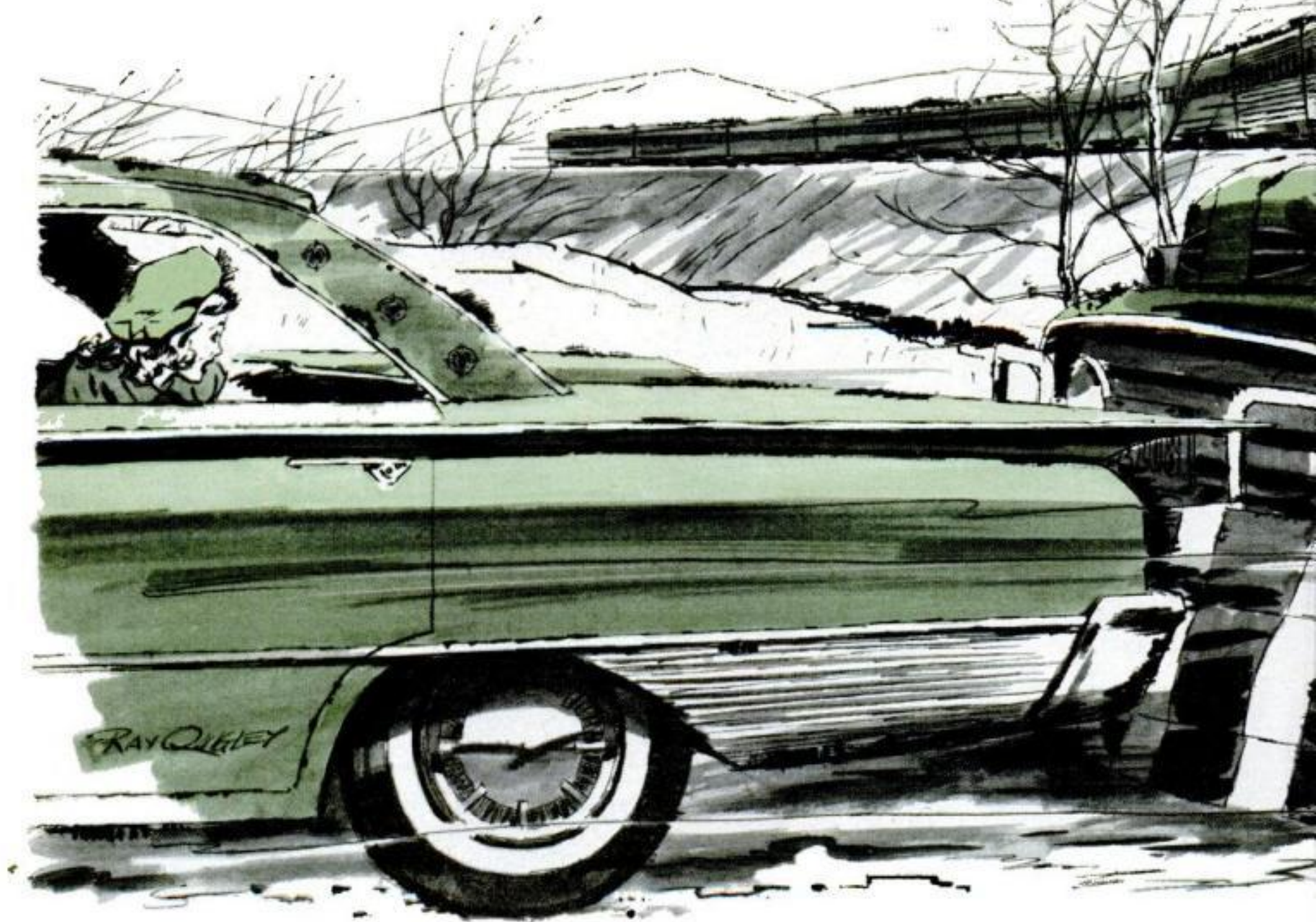
**ROCHESTER** **GM** **CARBURETORS**  
GENERAL MOTORS

America's  
number one  
original equipment  
carburetors



# Gus Takes a Long Chance

*It was one of those nothing-much-going-on days—then suddenly Gus was faced with the toughest choice he'd ever had to make*



**By Martin Bunn**

ONE eye on the clock, Stan hung up the inspection lamp, picked up a lubricant spray, and headed back under the small English sedan on the grease rack.

"Hold it a minute, Stan," said Gus, emerging from the office where he had taken a phone call. "What did I tell you about using this rack?"

Stan flushed under the grease smudges.

"Guess I did forget to put down that safety prop. But, Gus—it's only a light car."

"Nothing light about twenty-one hundred pounds if it falls on you. Sure, the risk of the hoist valve bleeding off is small. But why take any chance you don't have to?"

"Guess I tried to rush it. Mrs. Dolan wants her car at noon." Carefully Stan set the prop in place.

"Complained of squeaks, did she?"





*As the car moved, an air whistle screeched. In a split second a diesel locomotive was bearing down.*

"Yes, but nothing's loose," said Stan. "Shock absorbers aren't leaking. Chances are it's the spring leaves, so I'll spray on some oil."

"Mm. Before you take *that* chance, Stan, do me a favor."

"Sure, Gus. What?"

"Read the car manual. I left it on the seat, hoping you would." With that, Gus walked out to where his wrecker was parked, whistling innocently.

Smiling at the remembered expression

on Stan's face, Gus wheeled the wrecker over a county road, a short cut to the point on the turnpike from which the call had come. There he found a stalled motorist. A new fan belt soon put the disabled car back on the road.

The job done, Gus left the turnpike and headed back over the same winding road. Sun sparkled on gritty paving, the wrecker's motor purred competently, and Gus found time to wonder whether Stan had got the message about Mrs. Dolan's



car. Chances were—Gus smiled as the thought phrased itself in his mind—that Stan had.

THERE wasn't a hint, on that sun-drenched country road, that Gus would soon be taking a long and deadly chance of his own choosing.

The first innocent clue to it was an almost-new sedan ahead. As the wrecker crept up on it, Gus eased off the throttle. The other car was doing scarcely 30, and Gus fancied he heard a skip in the engine now and then. A double line forbade passing, so Gus stayed back.

As the road began to climb, the new car barely maintained speed. At the crest, just below a railroad crossing, Gus heard the other driver shift down. But the car lurched onto the track only to buck to an abrupt stop.

At that moment the crossing blinker began to flash its red-eyed warning. Simultaneously the other car's starter began to grind. As it kept on, Gus realized two things: The other driver could see neither blinker; and with the starter groaning, he probably couldn't hear the warning bell.

But as he shut off the starter, the clang reached him. The man behind the wheel put his head out, then renewed his efforts to start the dead engine.

"Why doesn't he jump?" thought Gus. The car's starter ground desperately. Even as Gus was about to get out and shout his warning, he saw something that impelled him to act. A child's face rose into sight at the rear window.

Quickly shifting into low gear, Gus approached the car as fast as he dared and nudged none too gently into the bumper. The child rose higher in surprise, and Gus saw that it was a girl.

As the other car moved, an air whistle screeched offside, and in a split-second glance Gus saw a diesel locomotive bear-

ing down, its cab looming in the wrecker's window. He felt his wheels bump over the tracks, saw the car lurch safely past the far blinker, and felt a shock of air as the train blasted by, inches behind the wrecker.

The car ahead rolled to the side of the road and stopped. Its driver got out shakily as Gus pulled alongside. A slender, sandy-haired, well-dressed man in his late forties, he evidently found it hard to speak.

"That was—we—thank you!" he blurted. "Knew it was time to jump—but we couldn't."

"You cut it too fine!" exclaimed Gus, but fell silent as the driver opened a rear door. The dark-haired little girl in back wore leg braces.

"She can have them off soon," her father explained. "We're headed for the doctor now. But she still can't move quickly. I—I don't think we'd have made it, except for you."

Gus mopped his damp face. "Bad time for a car to act up."

The man shook his head. "No, it was my fault. I knew it was time for new points again. Please tow us in and install them."

Where'd it come from?



KNOT: The nautical mile got its name because once it really was a knot—one of many at 47-foot intervals along a "log line." When the log end was thrown overboard, a sailor would count the number of knots unreeled within 28 seconds. Because knot spacings were in the same ratio to a mile as 28 seconds to an hour, their exact count gave the ship's speed.

AS GUS rolled into the Model Garage with the car, Stan waved and called. "Thanks for the tip, Gus."

"What tip?"

"About not taking a chance on that squeak job. This car has rubber spring bushes. The manual said to paint the bushes with brake fluid. I used rubber lube. No more squeaks."

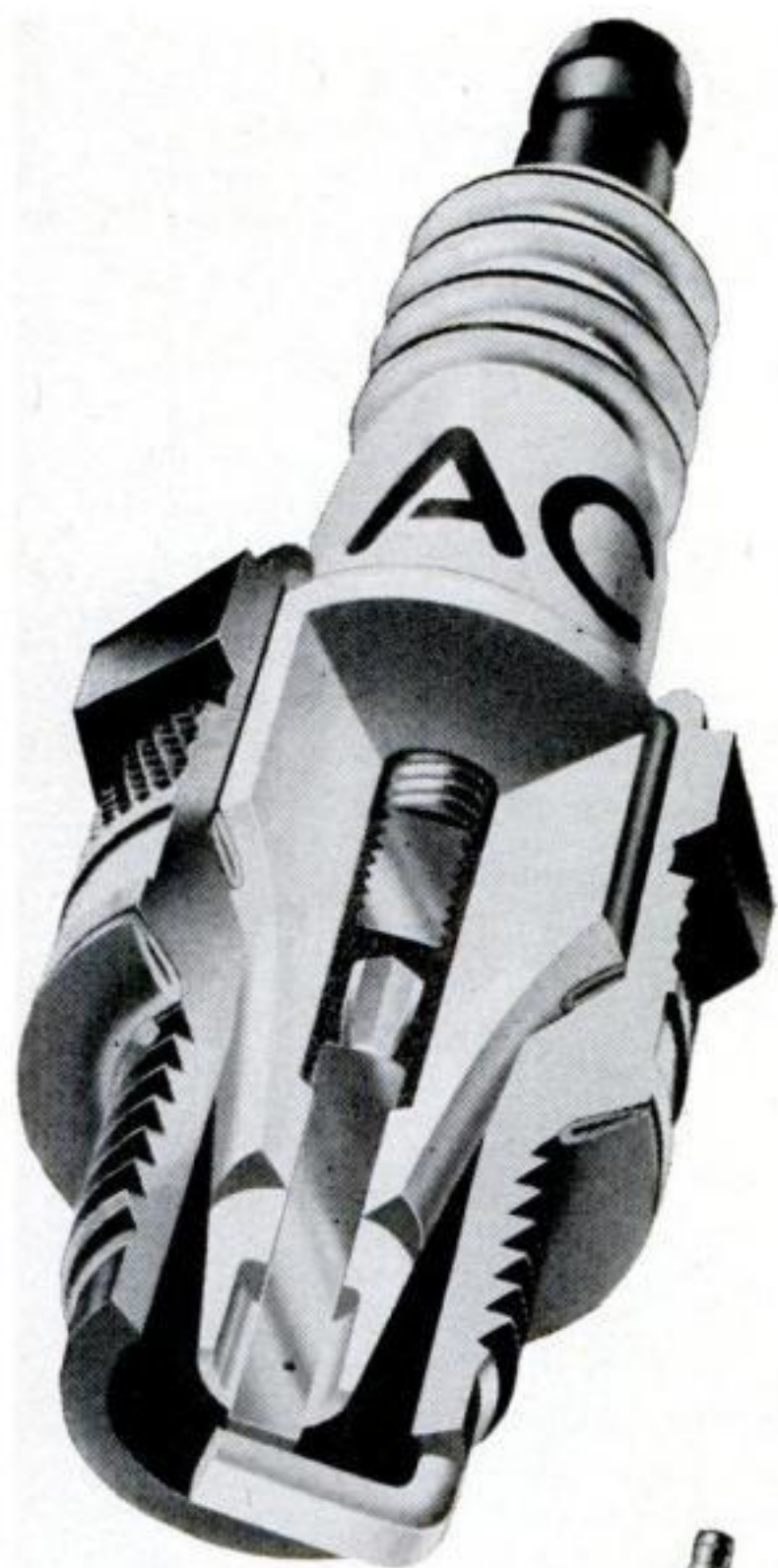
"Fine. While I eat lunch, you might check this car for hard starting."

When he returned, he found Stan replacing the distributor cap.

"It's a wonder he got out on the road. Points were the worst burnt I ever saw." Stan touched the starter. The engine caught at once. "See? New points. Got a real hot spark now."



# Exclusive Copper-Glass Seal Stays Gas-Tight Under 1400 Pounds Pressure



AC Fire-Ring Spark Plugs are your best buy in spark plugs for many reasons—but a big one is AC's exclusive Conductaseal that bonds the terminal screw and center electrode to the aluminum oxide insulator. This seal protects against leakage far better than ordinary seals. Leakage alters the spark plug heat range, which can damage the spark plug and, in turn, the engine. Conductaseal is a product of AC research. It is made of finely ground copper and glass, inserted into the center of the insulator and formed under terrific heat and pressure into an unyielding bond. It is tested under 1400 p.s.i. to give you trouble-free spark plug operation and long life.

The pictures on this page give graphic proof of Conductaseal superiority. Remember them the next time you buy spark plugs. For highest quality and greatest reliability, ask for AC Fire-Ring Spark Plugs.

AC SPARK PLUG  THE ELECTRONICS DIVISION OF GENERAL MOTORS

AC PRESENTS THE ART CARNEY SHOW, NBC-TV, FEB. 5



Skin-diver demonstrates how AC Conductaseal stays gas-tight under 1400 p.s.i., while ordinary spark plug leaks.



This X-ray check makes certain that the Conductaseal has bonded properly. It's one of 116 AC reliability tests.



Every AC Spark Plug features the exclusive Hot Tip that heats faster, cools faster to stay clean longer.



## They must be the best!

# AC Fire-Ring Spark Plugs



"Okay, Stan. Make out the bill. Half price on the tow."

"Half? But it was a road call—"

"Special case," snapped Gus, and escaped into the office. For an hour he made out bills, with an uneasy sense of having forgotten something. Finally he put his head out.

"Stan! Call me when the owner of that hard starter shows up."

"He's here now," said Stan in a curiously awed tone, and Gus saw that the stranger and the girl, whom he had dropped off at the doctor's door, were in the shop. Gus went over.

"I'm Ralph Emerson," said the stranger, "and this is Susan. It seems the

installed new wiring and sold them at a discount."

The wiring did look new, with no sign of water damage. Gus scrutinized the thin primary wires connected to the coil as if counting threads in the insulation. Disconnecting one, he hooked an ammeter into the line and turned on the ignition briefly.

"I think we've got it," said Gus. "Stan, get me an ignition parts list for this car."

Studying the sheet, Gus checked one item on it. Stan scurried off again.

"More trouble?" asked Emerson.

"The end of your trouble, I think," said Gus. "You won't need new points for a long time."

As Stan did the job, Gus motioned the customer and his daughter to chairs and began filling his pipe. "Actually, your dealer was conscientious. But he made a mistake."

"How so, Mr. Wilson?"

"Most ignition systems have a resistor in the primary circuit to hold current to a safe limit on starting and idling, when everything is cold and resistance low. Now some 1960 cars have a resistor *wire* instead. The mechanic who

rewired yours didn't know that. He ripped it out and put in ordinary wire."

"But the car ran well at first."

"Sure. The coil drew too much current, but gave a good hot spark—until that extra juice burned the points."

Emerson stood up. "I owe you more than I can ever repay, Mr. Wilson. If I can ever do anything for you, please give me the chance to do so."

"TALK about big shots," murmured Stan as the car pulled out.

"Who? Mr. Emerson?"

"Sure, he's the Supreme Court judge on those racket trials in the county seat. And *he* wants to do something for *you*."

"I don't remember breaking any laws lately," laughed Gus. "And anyway, I got this job without influence. In fact, it was more a case of push than pull."



whole town knows you, Mr. Wilson."

"It's a small town," answered Gus. "Now I remember! Did you say it was time *again* for new points?"

Emerson nodded. "Sixth time since I've had this car. It burns them up in two weeks. Nobody knows why."

"The condenser's okay," volunteered Stan. "I checked it out."

"Everything's okay," agreed Emerson. "But the points always burn."

"How about the coil?" asked Gus.

"One man put in a new one a month ago. He thought the factory had installed a six-volt coil by mistake. But it made no difference."

"Did you buy the car new?"

"Yes, at a bargain. Then I heard why. The dealer had bought a number of new cars from an out-of-state agency in a flooded area. He hauled the cars here,

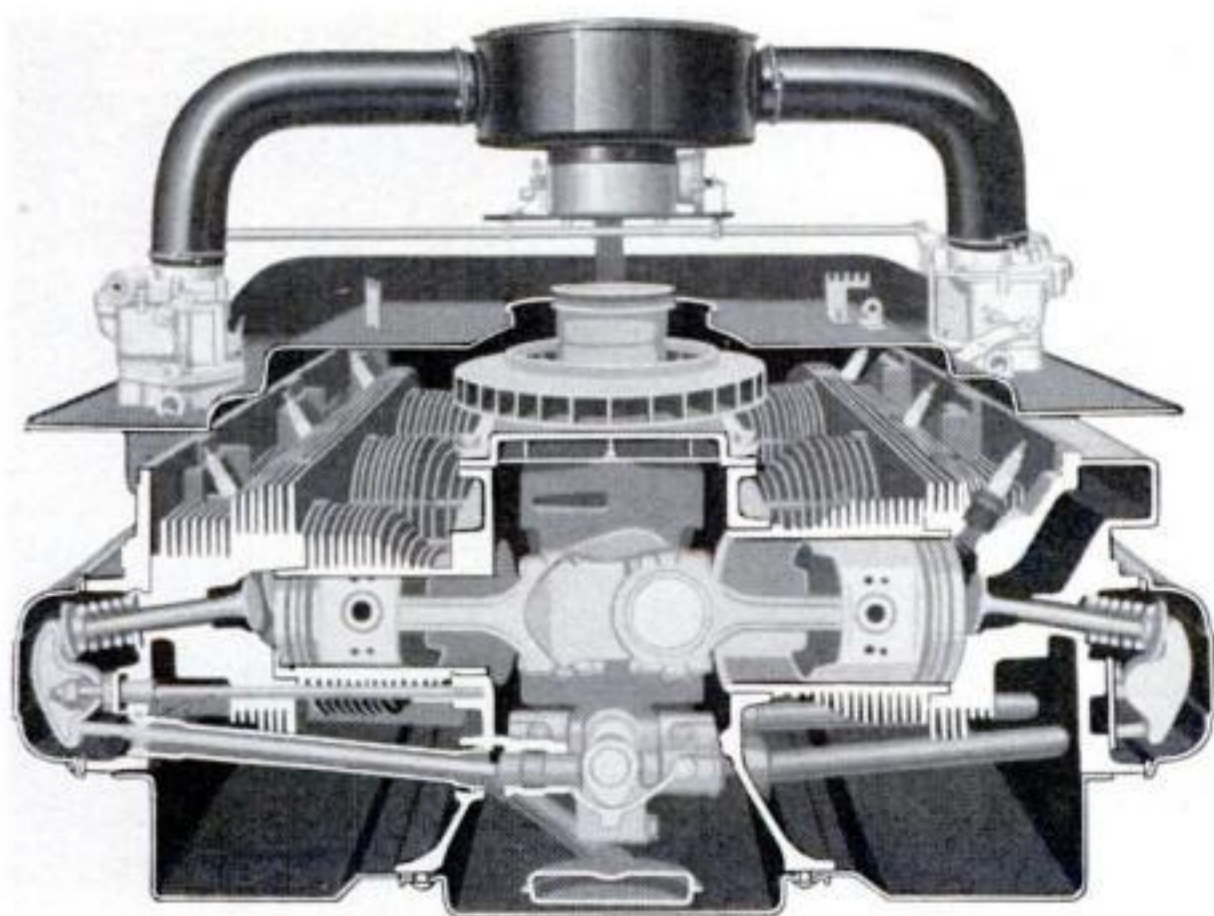


# CORVAIR'S A NEW SMOOTHIE

Behind Corvair's array of engineering innovations (*literally behind*) lies its engine: America's first and only rear-mounted air-cooled aluminum "pancake" six. The spec sheet reads like this: 140 cubic

like "pancake." Translated, it means that this is a horizontally opposed six, instead of the conventional in-line type. If you cut the engine crosswise, it would look like the picture.

There are three pairs of cylinders, of course, each working in unison. When one piston is at the top of its stroke, so is its mate. So? Well, Barney Navarro, who's engineering editor of Motor Life magazine and should know about these



inches of displacement, bore 3.375 inches, stroke 2.60 inches, maximum horsepower 80 @ 4400 r.p.m., maximum torque 125 ft.-lb. @ 2400 r.p.m. (Hitch these figures to a car weighing only 2,375 pounds at the curb and you've got yourself a peppery package, if we do say so.)

Anyway, of the four adjectives, we particularly

things, writes "opposed engines (of Corvair's design) are inherently balanced." In other words, each pair of pistons, rods and crank throws balance each other, and there's no need for counterweights. Because this type of engine is inherently balanced, it's inherently smoother than an in-line six. And after all, ultra-smoothness

is just what you're after.

As you might suspect, there's precious little of the commonplace in a Corvair engine. Yet there's nothing so radical that it hasn't been proved time and again for reliability. About the only question left now is whether we can build enough of these cuties to fill the demand. One thing you ought to do for sure is to try one out. After that, you'll probably be badgering us to build *you* one. This is a problem we're happy to have. . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

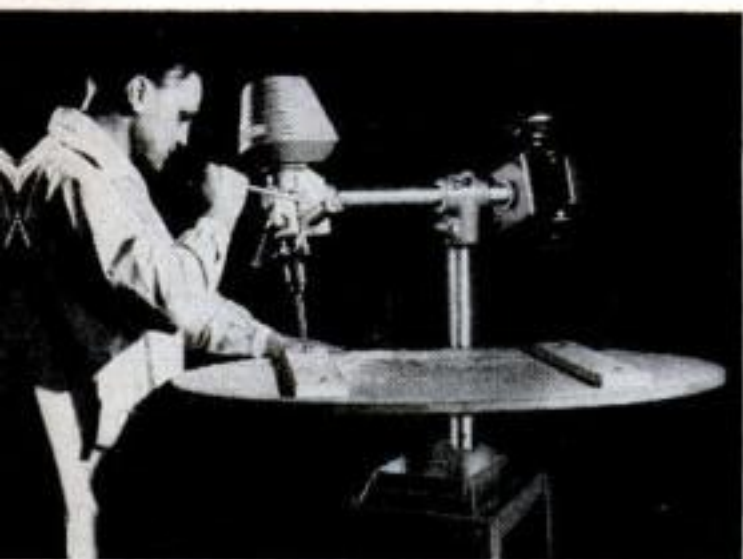
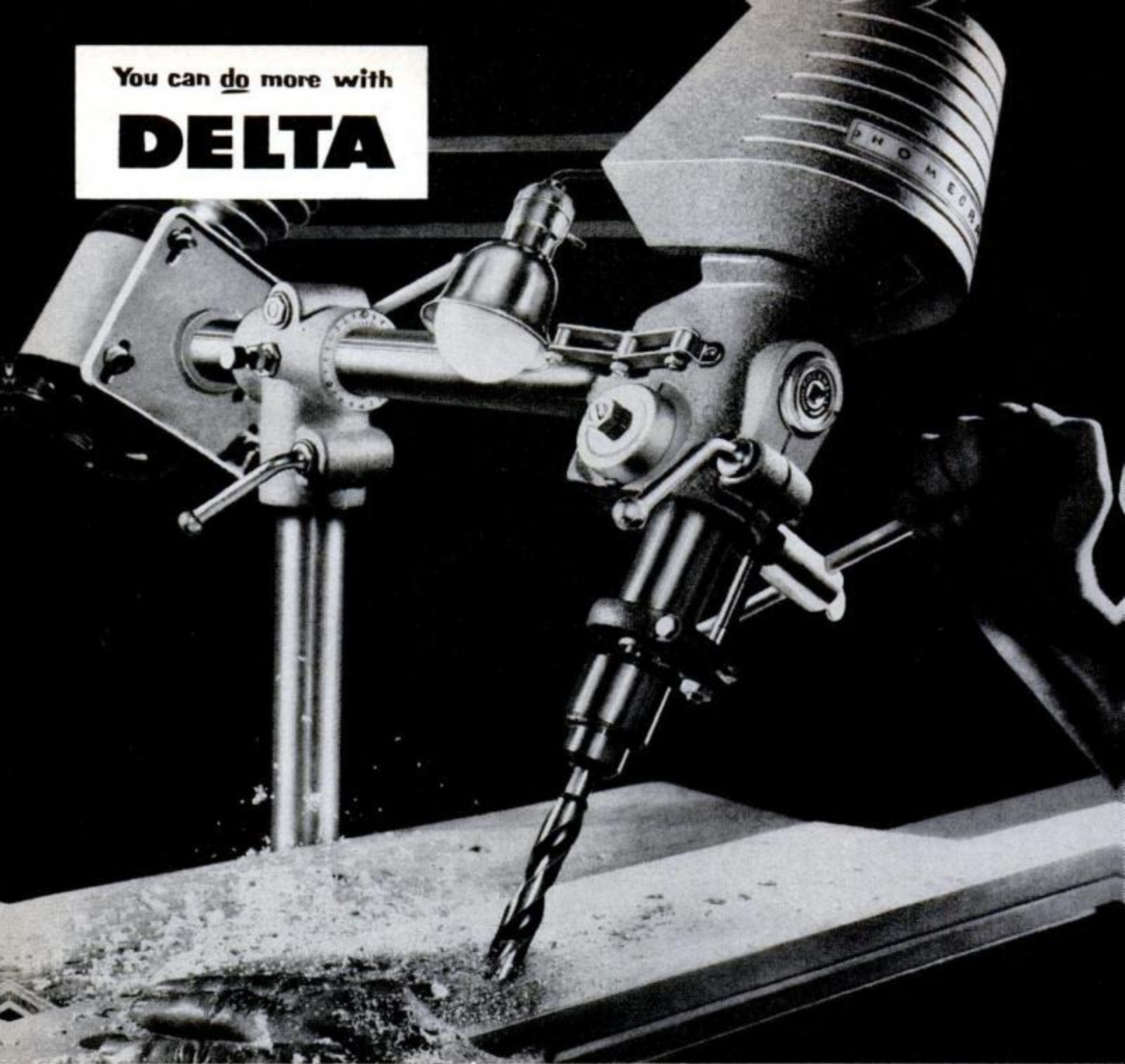
*That rear engine is just one of the engineering marvels in this new Corvair. Others include the silken smoothness of independent suspension at all 4 wheels . . . a practically flat floor, front and rear . . . briskly competent handling . . . and the ingenious unit combining the engine, transmission and rear axles. Be prepared to spend some time with these wonders when you check out the revolutionary Corvair at your dealer's.*

**corvair**  
BY CHEVROLET



You can do more with

# DELTA



**Angular drilling** for the splayed legs on a coffee table is no problem with this tool because the angle of right or left tilt can be set by a calibrated scale and locked into position. Resetting head to vertical position is simplified by setting of the automatic stop into a milled groove.



**Inlay routing** in the center of a 30" x 40" project is possible because there is 16 $\frac{3}{8}$ " capacity between the column and the router bit. Use of the fastest of the four speeds available makes this a smooth operation. Controls are conveniently grouped "up front" for safe, positive action.



**Spindle drilling** on an extra long hand rail *does not* require a special fixture or jig because the head tilts. Big  $\frac{3}{4}$ " x 23 $\frac{3}{4}$ " x 15 $\frac{7}{8}$ " table gives adequate support while remaining parallel to the base. Laminated wood work surface is mounted to a fully machined 8 $\frac{1}{2}$ " x 9" cast iron table.



# New radial drill press



**makes  
"impossible" drilling  
easy**

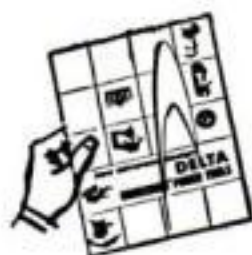
**DELTA 32" RADIAL DRILL**—basic machine complete with  $\frac{1}{2}$ " capacity geared chuck, belt and motor pulley.

Weight 85 lbs—only **\$89.50** (slightly higher in the West).

Here's just what you'd expect from Delta—a brand new radial drill—specifically designed to handle drilling jobs you *can't* do on a conventional drill press. There is almost no limit to the flexibility this tool puts at your fingertips—and you'll really appreciate the big capacity. The head swivels 360° around the column, tilts more than 90° left and right, travels almost a foot forward and back—yet the work always remains parallel with the base. You can drill to the center of a 32" circle, rout, sand, mortise, do dozens of operations at your choice of four speeds (700, 1250, 2400, 4700 r.p.m.) on a wide variety of materials.

You can count on this tool to extend your skill, broaden your range of projects. And because you know tools, you know you can count on the precision, ruggedness and safety that Delta's 31 years of experience build into tools used throughout industry and in home workshops.

Consider the many ways you can do more jobs better, quicker and easier with the *newest* Delta tool—you'll want to see the Radial Drill in action! Visit your Delta Dealer (he's listed under "TOOLS" in the Yellow Pages) or your leading Department, Hardware or Building Supply Store. Do it soon!



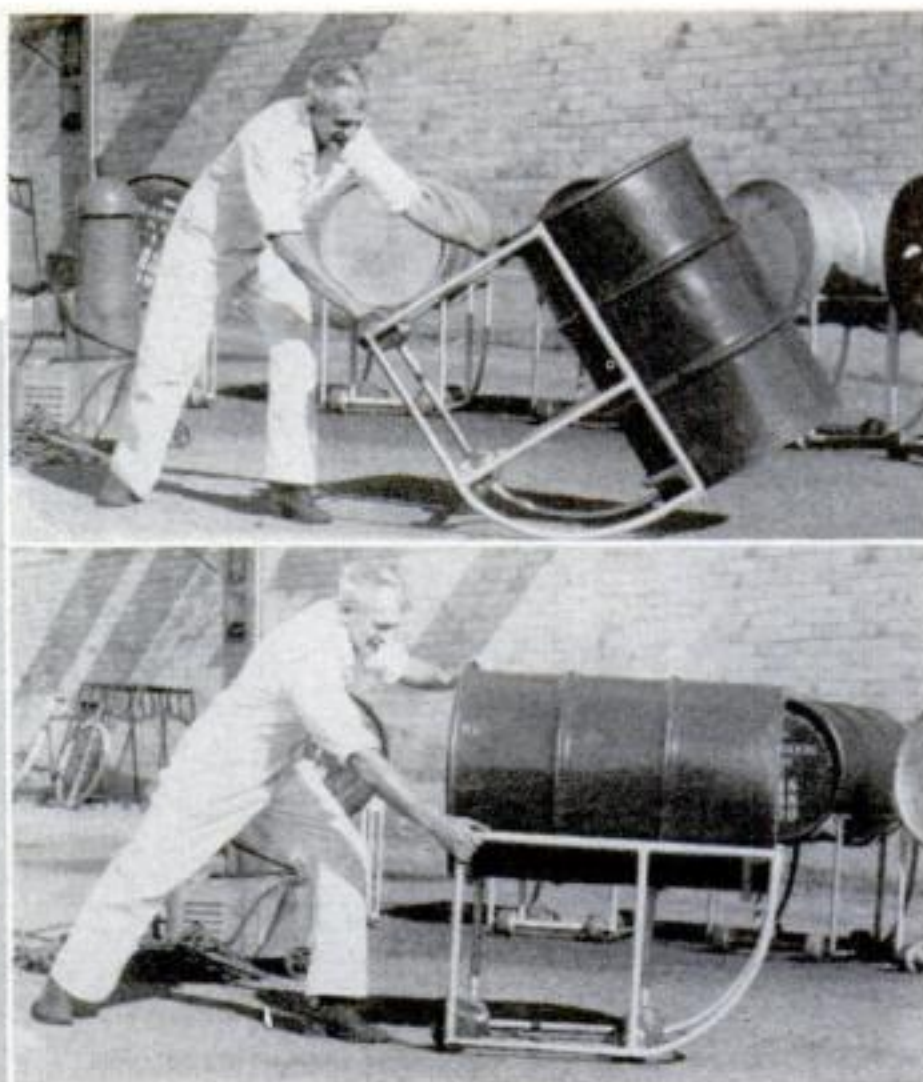
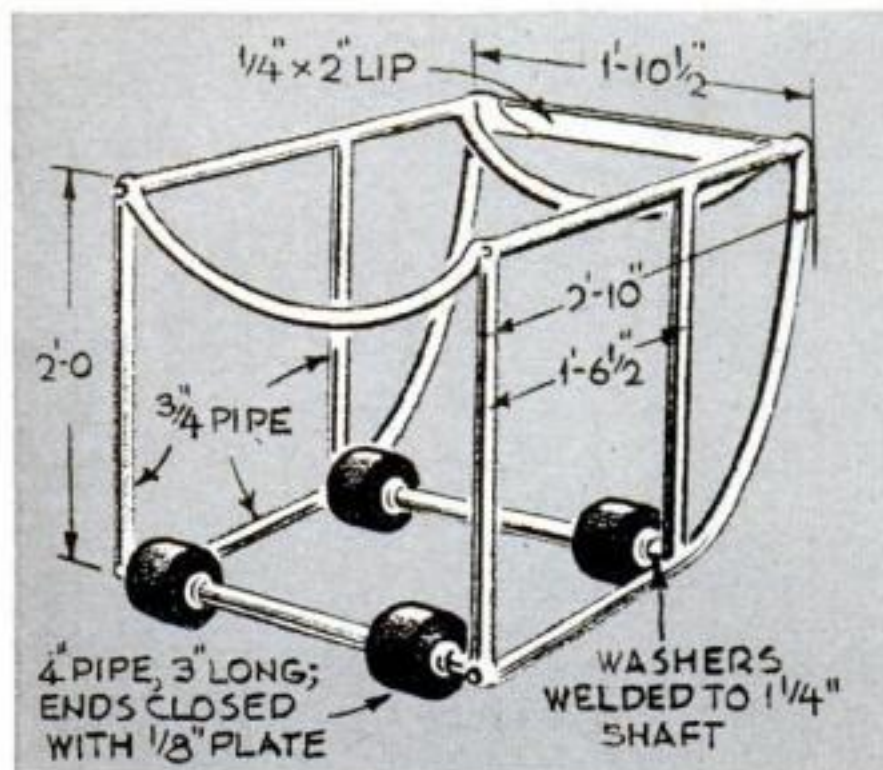
See the world's most complete line of home workshop power tools and accessories—pictured and described in this colorful, **FREE** Homecraft catalog. Write to: Rockwell Manufacturing Company, Delta Power Tool Division, 504BN Lexington Ave., Pittsburgh 8, Pa. In Canada: Rockwell Manufacturing Company of Canada, Ltd., Guelph, Ontario.





## Short Cuts and Tips

FROM PS READERS



### Rocking Trolley Lifts and Stores Drums

LIFTING filled drums to pouring racks was a problem at our bulk store. Now this loading trolley makes raising and moving the drums an easy one-man job. The trolley is rocked forward and its flat

lip is hooked under the drum. Then rocking the trolley back on its wheels raises the drum to a convenient height for filling smaller containers.—*W. G. Richards, Grafton, N. S. W., Australia.*

### How to Raise a Table

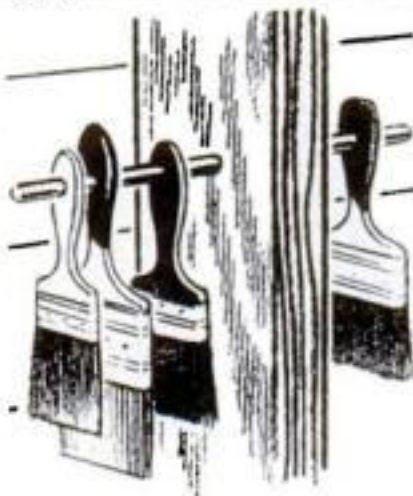


IF A card or chair-side table is at an inconvenient height for eating or working, give it a lift. An easy way is to screw rubber-tipped doorstops into the legs. Drill pilot holes to keep the wood from splitting.—*Frank A. Javor, North Bergen, N. J.*

### Neat Paintbrush Hanger

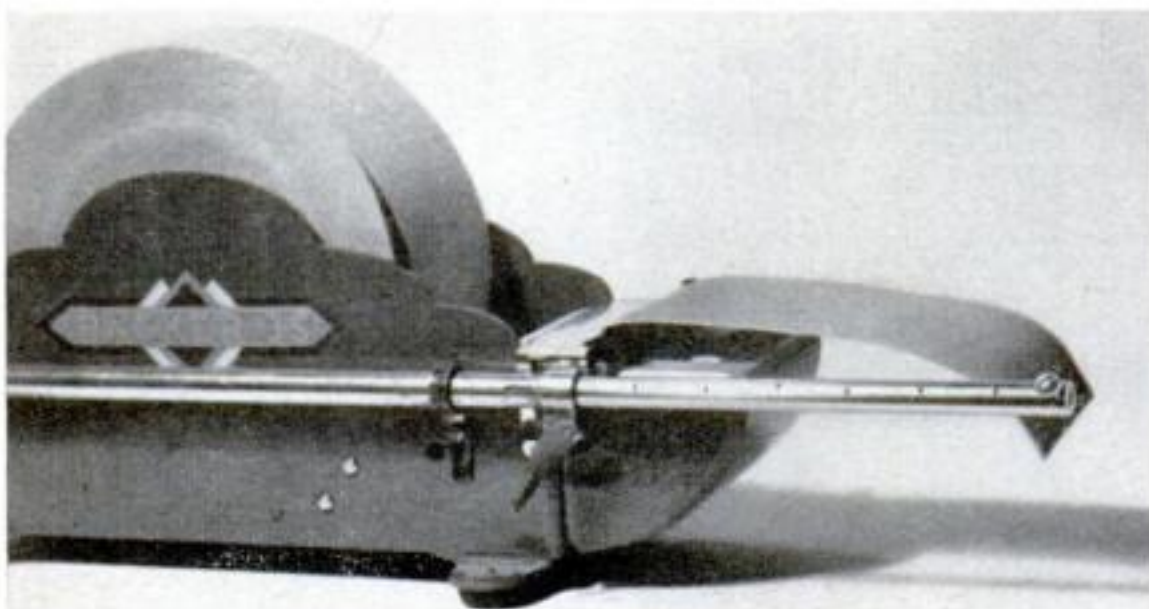
A SHORT length of 1/4" dowel makes a handy rack for storing your brushes between paintings. Drive the dowel through a hole drilled in a wall stud. Holes in the brush handles should be drilled a little larger than the dowel.—

*G. E. Hendrickson, Argyle, Wis.*



### Music Stand Gauges Tape

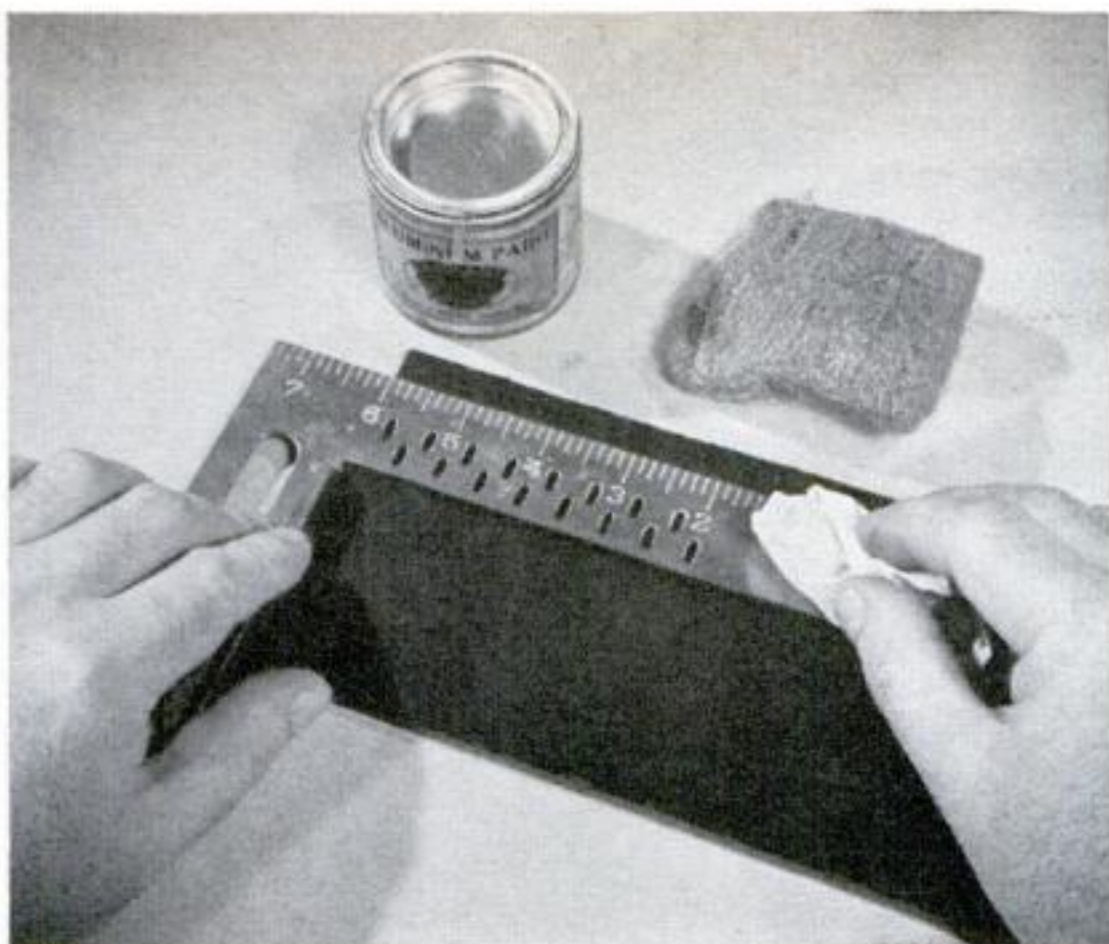
A MUSIC-RACK stand can simplify cutting uniform lengths of gummed tape. Clamp the outer telescoping tube to the side of a tape dispenser. The inner tube can be locked at any length indicated by holes drilled an inch apart. The gauge will measure up to 15".—*W. Williams, Culver, Ind.*





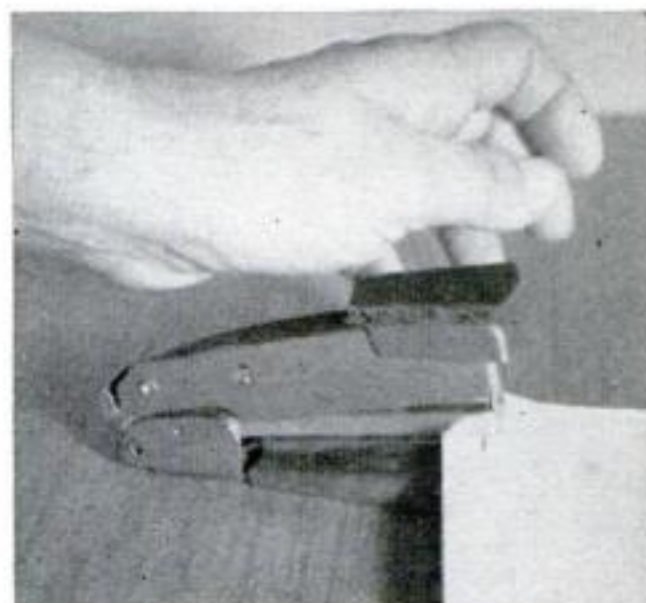
## Short Cuts and Tips

FROM PS READERS



### Renewing Lines and Numerals on Rule

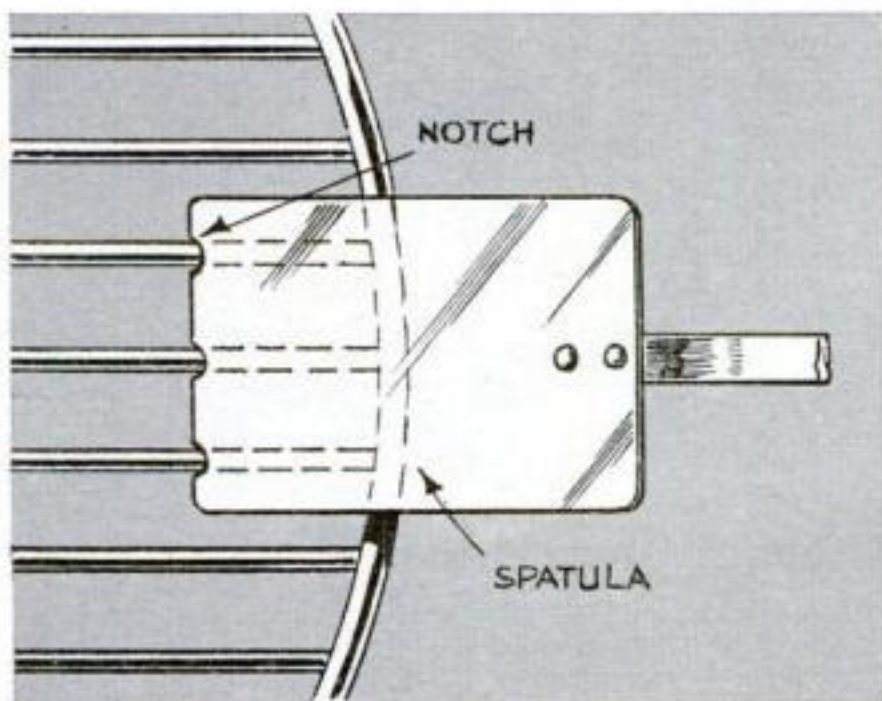
WHEN a shop tool such as a try square becomes so rusty that you can't read the engraved markings, you can refinish it by scouring off the rust and cleaning with fine steel wool. Wipe dry. Then coat with aluminum paint and wipe the surface immediately, leaving the paint in the lines. They will show up like new.—*Murray Kent, Flint, Mich.*



### Cushion for Stapler

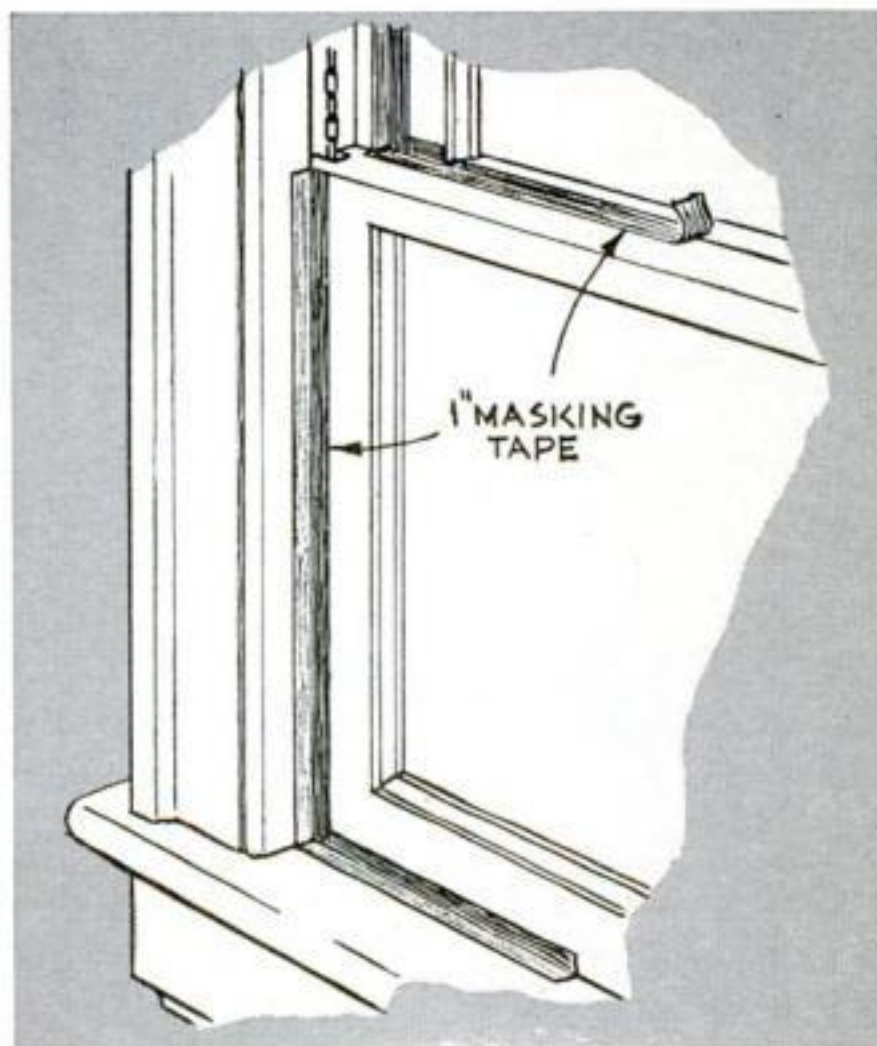
I CEMENTED a 1/4"-thick piece of sponge rubber to the top of my stapler to provide a cushion for my hand. It makes pounding easier when a lot of stapling is to be done.—*Donald Spichuk, Brooklyn, N.Y.*

▶▶▶ A BRUSH of the kind used for washing bottles is handy for cleaning on the patio. Dip it in soap suds, and you can coax dirt from plastic and rope lacings and webbings, cushion seams and crevices, wicker and wrought-iron furniture.



### Outdoor-Grill Spatula

YOU can lift steaks and hamburgers from a grill with a pancake turner notched to go between the grill rods. Space the notches to fit the rods and cut with a rat-tail file to a depth equal to that of a rod.—*E. Damask, Virginia Beach, Va.*



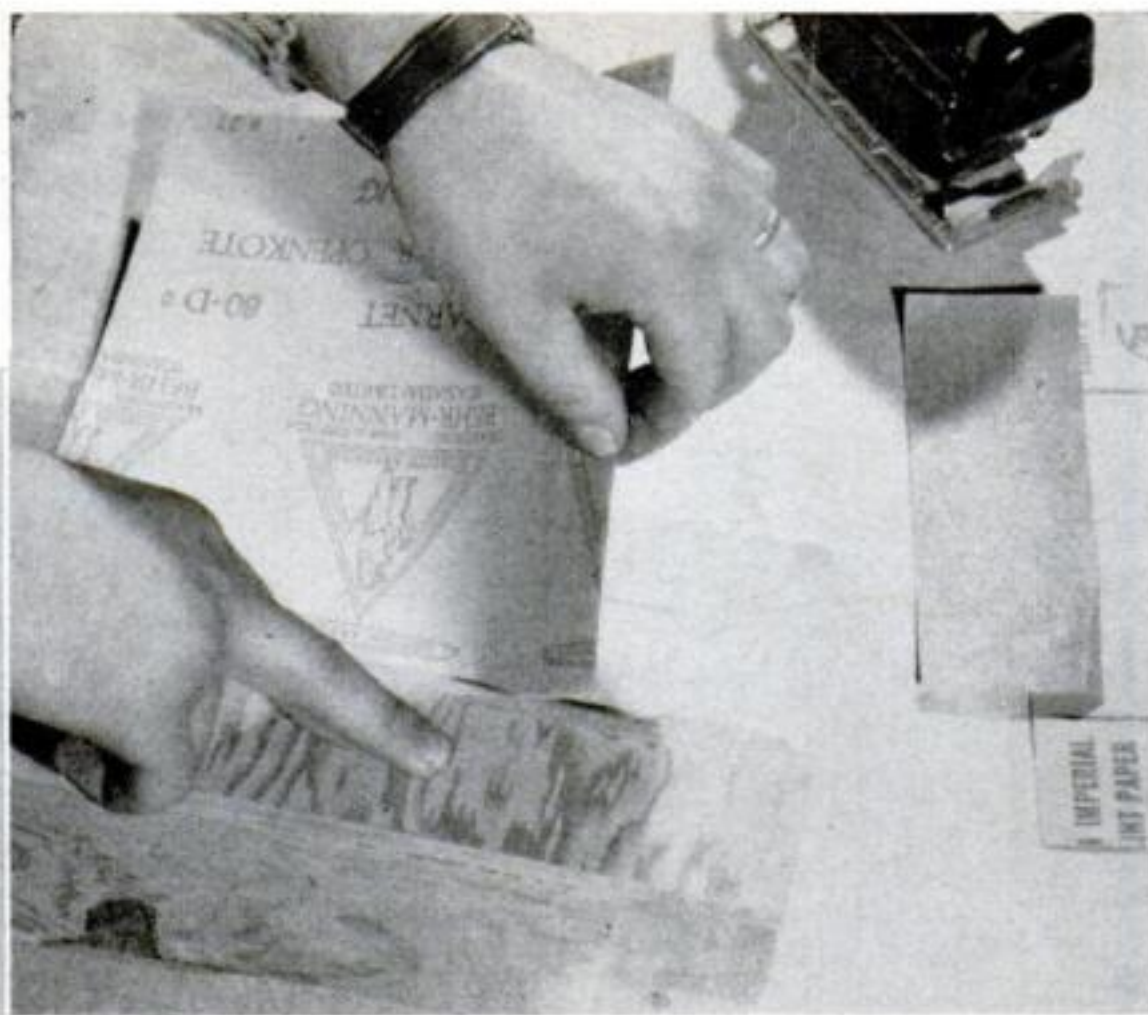
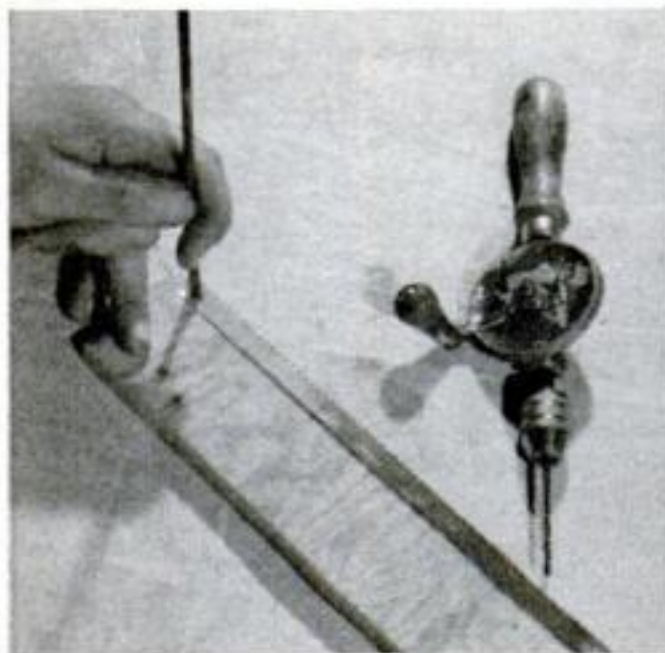
### Draftproofing a Window

A WINDOW that doesn't have a storm sash can be sealed against drafts with masking tape. I use 1" tape to cover the crack between window and frame. The tape is easy to remove for cleaning, costs little to replace.—*Frank Harazim, NYC.*



## Short Cuts and Tips

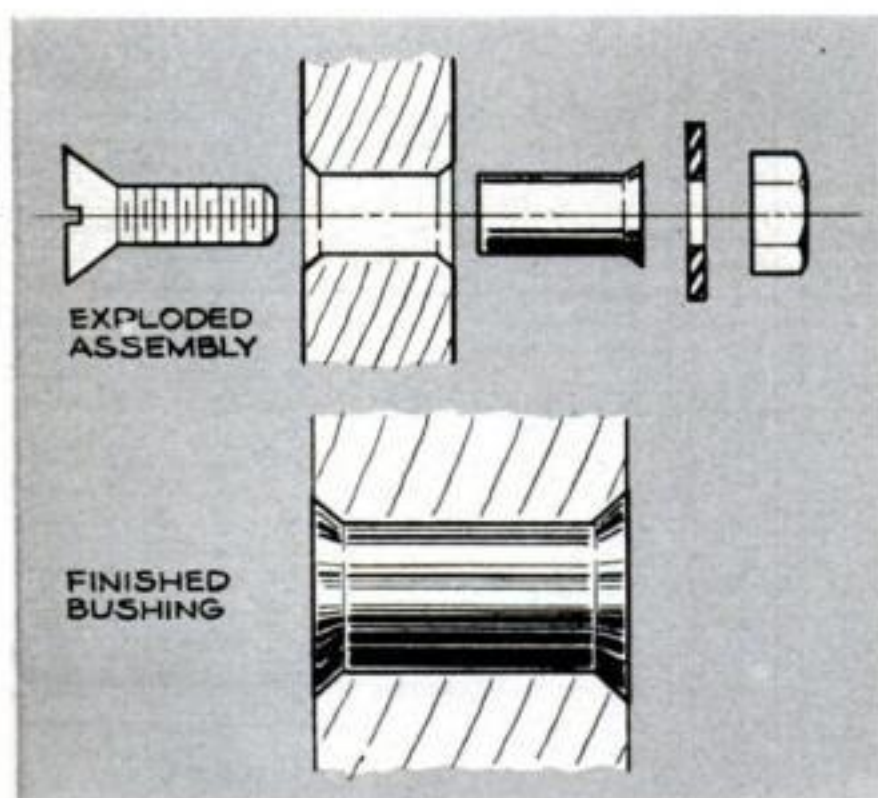
FROM PS READERS



### Using a Hacksaw Blade as a Sandpaper-Cutting Jig

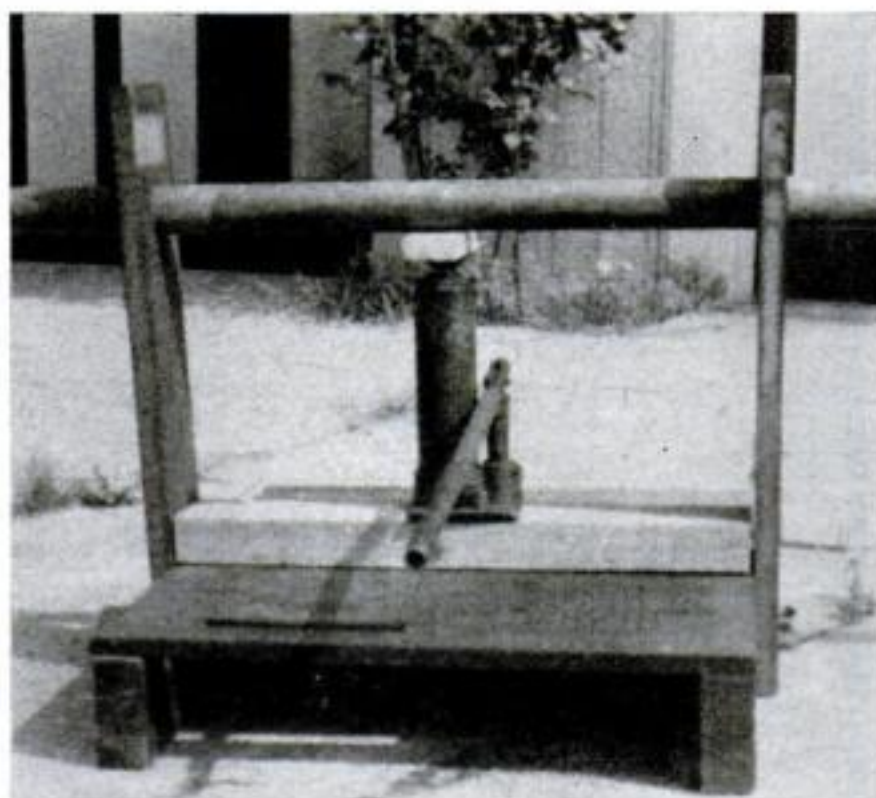
TEARING sandpaper to fit your power sander is easy with this simple jig. Fasten an old hacksaw blade, teeth pointing out, to one edge of a piece of  $\frac{1}{2}$ " plywood the width of your sander. To

use the jig, place it, blade side down, on a sheet of sandpaper, with the back edge of the plywood lined up with the edge of the paper. After that—just tear.—*Eric Nissen, Vancouver, B. C.*



### Metal Bushings in Wood

A METAL-BUSHED hole in wood, useful for long-lasting wooden pivots or drains, can be made from a short length of soft copper tubing. First countersink both sides of the hole. Then insert a glue-covered length of tube that has been flared at one end. To lock the tube permanently in place, flare the other end by compressing it under the conical head of a snug-fitting machine screw.—*Joseph Whitehill, Easton, Md.*



### TV Mast Straightener

WHEN my TV antenna mast was bent in a high wind, I salvaged it with the bending jig above. The jig consists of two boards drilled to take the largest mast section, and bolted to the sides of a two-by-four frame. I slipped a bent section of the antenna mast through the holes, and put a wood-padded jack beneath the bottom of the bend. Raising the jack straightened the mast in short order.—*C. E. Palmer, New Haven, Conn.*



# BUY **GRAVELY** FOR

## MORE PERFORMANCE MORE POWER MORE FOR YOUR MONEY

Why plow with equipment you have to push, pull and help? Gravelly and its Rotary Plow attachment tills a perfect seedbed in one operation—all you do is guide it!

Gravelly does the tough jobs other tractors can't . . . because Gravelly has reserve power—now 6.6 Horsepower! Improvements in design and quality make the new Gravelly an even better buy than ever!

**INVEST in the  
BEST!**



**30 TOOLS**



### UNMATCHED PERFORMANCE

Choose the tools that fit your jobs from 30 year-round attachments. All powered by one Gravelly tractor!

Do the job *better* because power attachments are driven direct from the engine by splined steel shafts and gears. No belts or chains to slip, wear or break. More power *at the working tool!*

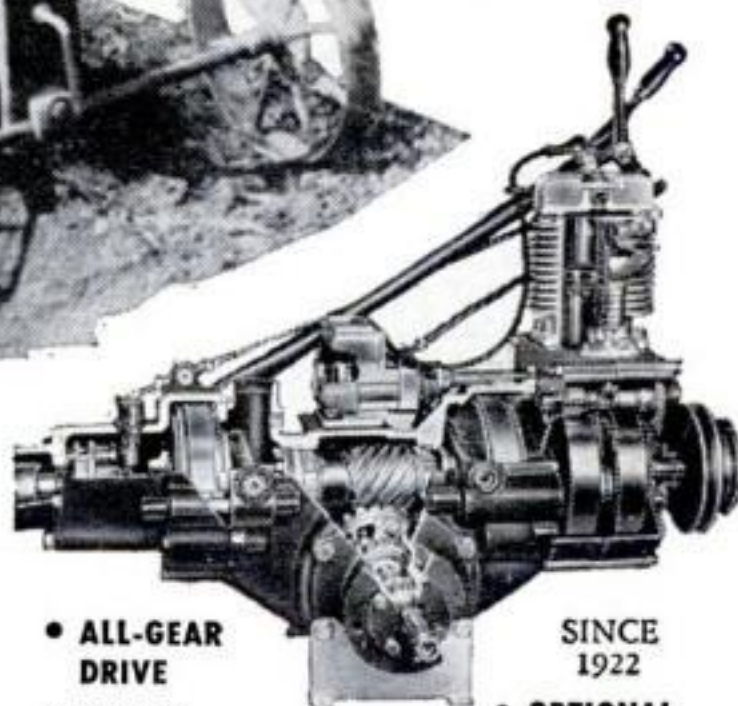
A **FREE** demonstration by your local sales and service representative will show you, beyond doubt, that the Gravelly and its attachments will do your jobs *better, faster, easier*. Compare. You will see that you get *more power, more performance, more for your money!*



### FREE 24-PAGE BOOKLET!

Big, 24-page illustrated booklet, "Power vs Drudgery", shows how the Gravelly solves your lawn and garden problems . . . Write for it today!

**FREE! MAIL NOW**



- ALL-GEAR DRIVE
- POWER REVERSE

SINCE 1922

- OPTIONAL STARTER

Power attachments *securely* mounted by only four bolts. Balance, easy handling, simple controls. Cutaway view shows Gravelly's clean, compact, power-engineered design—the reason for its remarkable performance. Make the wise choice—choose Gravelly!

**EASY PAY PLAN**

**GRAVELLY TRACTORS, INC.**  
P.O. BOX 602-B DUNBAR, W. VA.

Please send "Power vs Drudgery" Booklet and dealer's name to:

Name \_\_\_\_\_

Address \_\_\_\_\_

Town \_\_\_\_\_ State \_\_\_\_\_

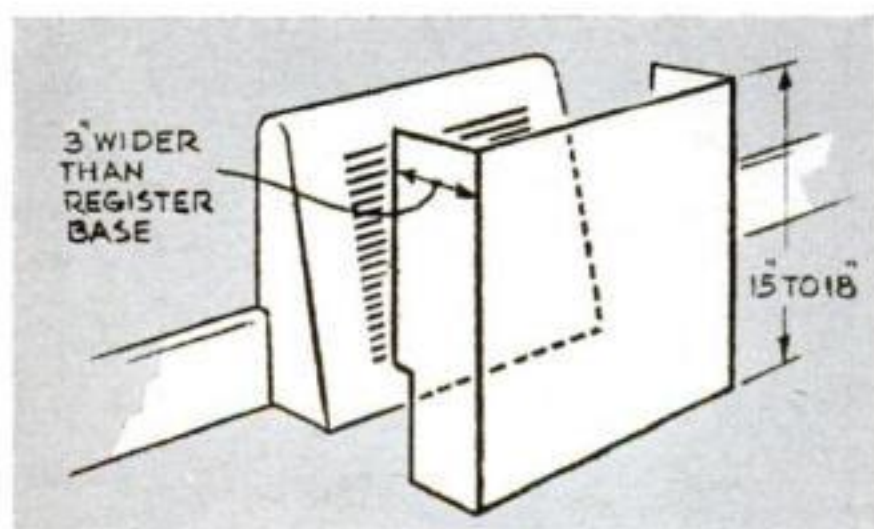
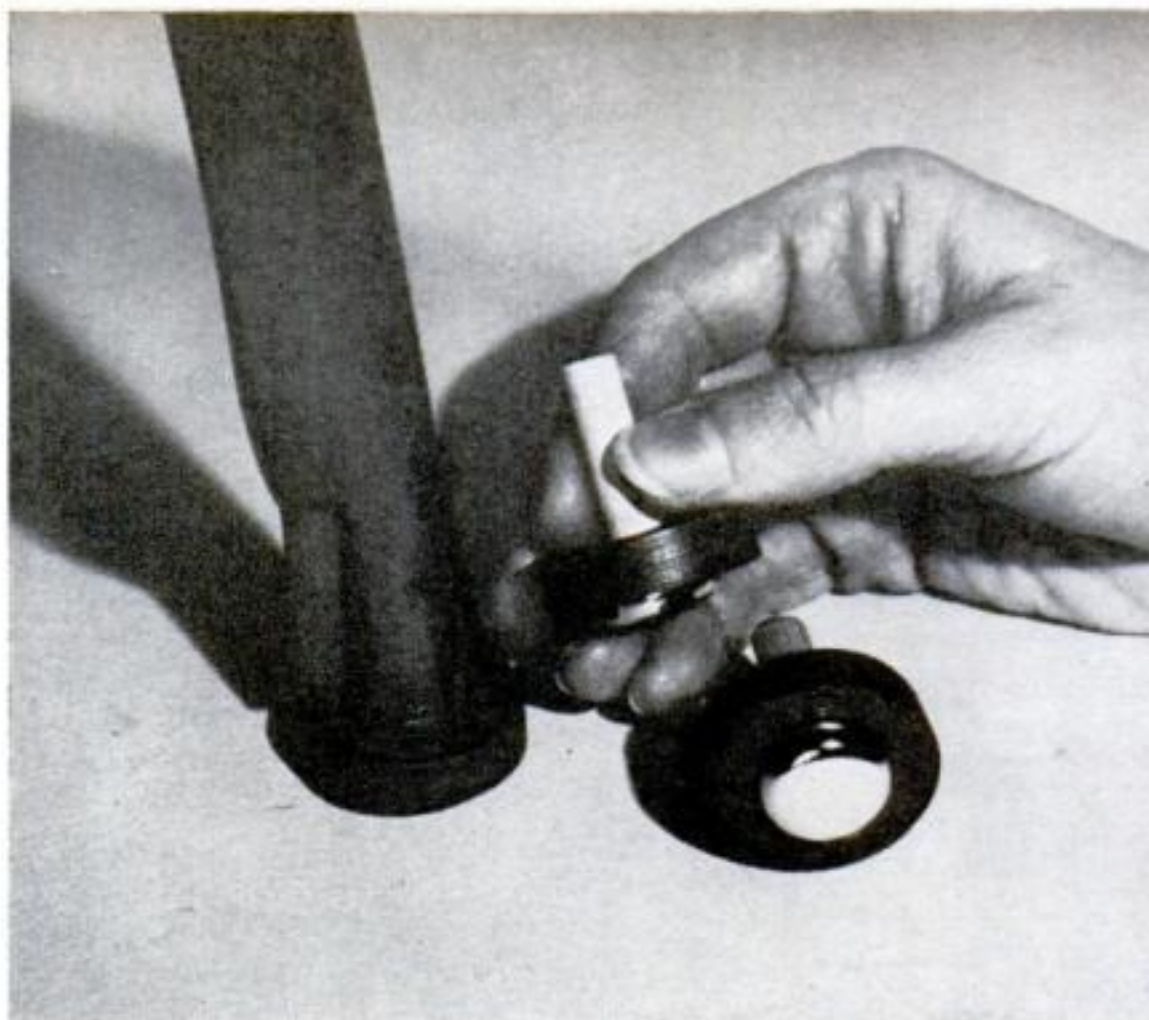


## Short Cuts and Tips

FROM PS READERS

### Checkers Hold Metal Glides

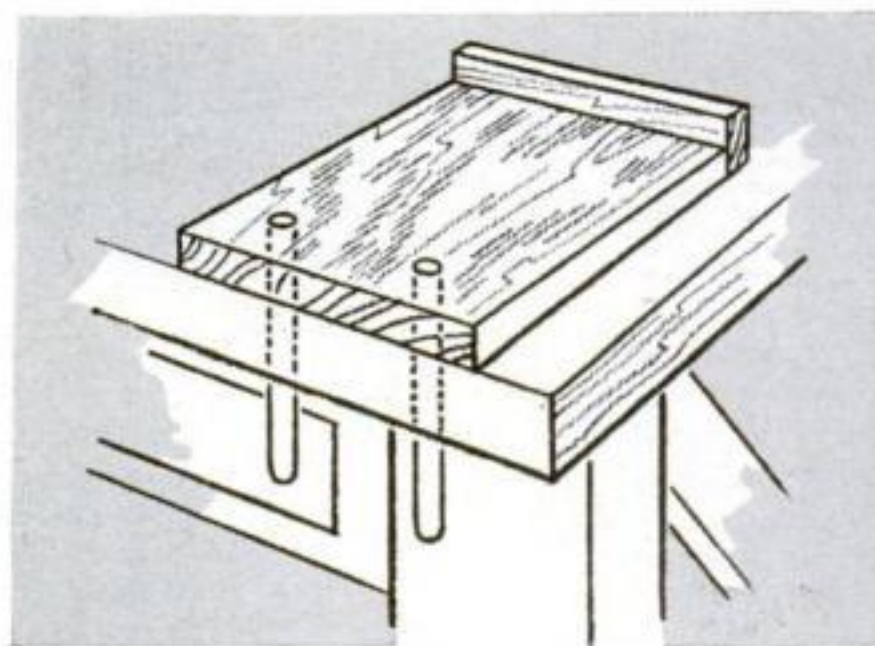
ROLLER casters aren't too steady on a typewriter table. For a firmer footing, you can replace them with metal furniture glides attached to the bottom of pieces from an old checkers set (left). Drill checkers to take a snug dowel fit. Glue the dowel in and slip it into the caster hole.—*Frank A. Javor, North Bergen, N. J.*



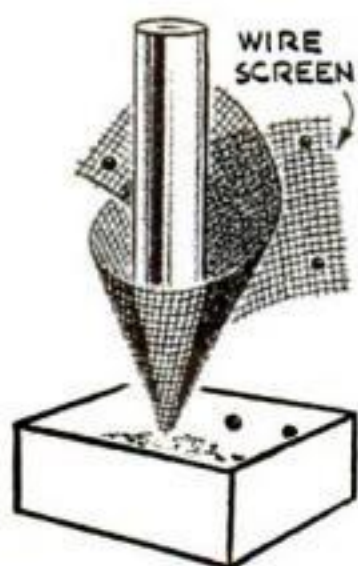
### Better Heat from Register

BASEBOARD registers in rooms farthest from a gravity-type warm-air furnace may act as cold-air returns. A metal shield around the radiator prevents this and lets the warm air flow up. Make a trial shield of cardboard. If heating improves, replace it with a permanent one painted to match the room. Fit it snugly against the floor.—*E. T. Roetman, Palatine, Ill.*

▶▶▶TRASH and cut-brush fires can become dangerous if they get out of control. A neighboring farmer eliminates the hazard by raking the stuff into a pile and letting it dry. Then he covers the heap with a large tarpaulin. After a soaking rain, he removes the tarp and does his burning.—*James Vick, Petersburg, Va.*



### Screen to Point Chalk



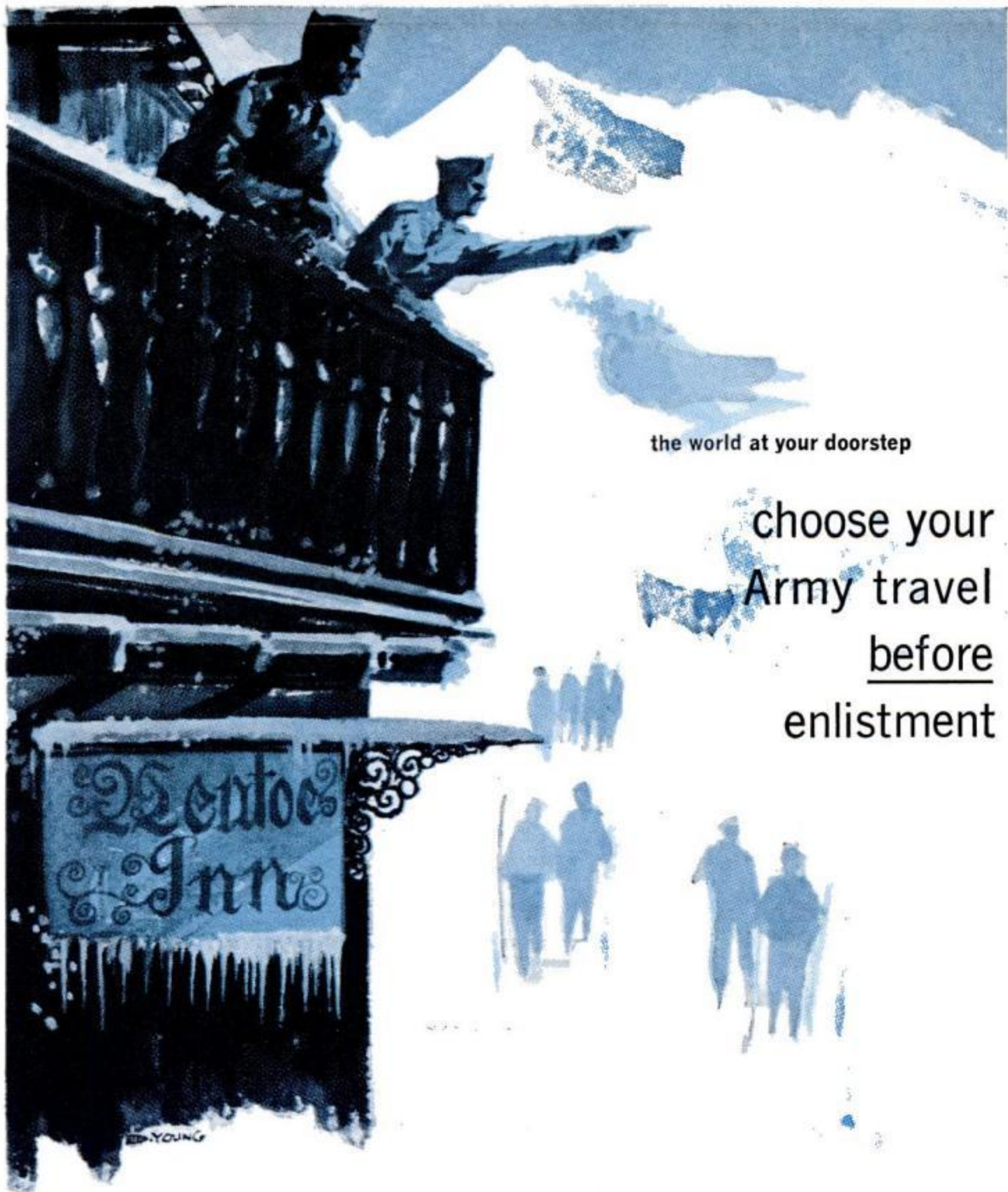
SHOP crayons and chalk can be kept pointed easily with pieces of screen rolled into a cone. The sharpener can be tacked up at a convenient place. A container placed beneath the screen will catch shavings.—*Jim Knock, Hanley, Sask.*

### Tight-Holding Bench Hook

WANT to make a bench hook secure? Drill mating holes in the end of the hook and the bench edge. Drive snug-fitting dowel pegs to make your setup as needed.—*G. E. Hendrickson, Argyle, Wis.*

▶▶▶WHEN hanging doors, you'll do well to use an old carpenter's trick. For each foot of door height, allow 1" from the top of the door to the top hinge, and 1½" from the bottom to the lower hinge.—*O. L. Long, Costa Mesa, Cal.*





the world at your doorstep

choose your  
Army travel  
before  
enlistment

**Like skiing?** How about the Bavarian Alps? Swimming? Try the beautiful blue Mediterranean. Mountain climbing? Tackle the heights of Mt. Fujiyama in Japan. Today's Army lets you **choose** the oversea area where you'll be stationed—Europe or Far East. On duty and on leave, you'll be able to travel widely while you're there. Ask

anyone who's traveled. Nothing beats the excitement of new and fascinating places. And now the Army puts them at your doorstep. So don't just dream of faraway places you'd like to see. Make your travel arrangements with your Army recruiter this week. See him—and choose your travel before you enlist!

CHOICE, NOT CHANCE



# US ARMY



**Porter-Cable**  
*Quality Power Products*



## CREATED FOR THE MOST PARTICULAR CRAFTSMAN ... Porter-Cable 6½" CIRCULAR SAW

Power tools are a long term investment. That is why you should consider every Porter-Cable feature . . . the Model 66's extra powerful motor that enables you to make every possible cut, including 45 degree angles for 2 x 4's, safety telescoping guard, instant depth and calibrated bevel adjustments, famous kick-proof clutch, self-lubricating bearings. And like every Porter-Cable tool, it has that custom quality look . . . and the built-in ability to deliver top performance year after year. Buy during Porter-Cable's January tool days . . . Model 66 Saw . . . only \$39.95.

**PORTER-CABLE MACHINE COMPANY**  
6152 Marcellus Street, Syracuse 4, N. Y.



## City Under Ice

[Continued from page 89]

month tours of duty will make icecap isolation seem less far away from home.

**Some problems solved.** Camp Century—so named because its original site was 100 miles out on the icecap—is being built by the Army Corps of Engineers after five years of preliminary construction experiments on the Greenland icecap. Its research programs will be directed by the Army's Chief of Research and Development. The working areas will be dominated by scientific laboratories, but should the need come for a similar military installation—perhaps an under-ice launching site for intercontinental ballistic missiles or interceptors—we have the blueprints, the techniques, the machines. At Camp Century, the Engineers have proved that they can:

- Make efficient use of construction materials at hand—snow and ice.

- Dig cut-and-cover trenching with an adaptation of Peter Snow Millers—huge rotary snow plows that for years have been keeping passes in the Swiss Alps open during winters.

- Adapt mechanical coal-mining machines to carve caverns into ice-hard snow to make expanded quarters, as well as space for storage and food refrigeration.

- Solve the water-supply problem, always serious in the Arctic, by drilling wells 150-feet deep, shooting down jets of steam, and pumping out water.

- Utilize an air-transportable nuclear power plant, with a capacity of 2,000 kw., to furnish light, heat, and power. A core of U-235 weighing less than 50 pounds will produce a year's supply of electricity—doing the work of 35,000 barrels of fuel oil.

One thing the engineers haven't been able to lick is the slow, plastic movement of the ice, which causes the walls to close in and the corridors to twist. With periodic shaving of the ice, they expect the camp to last about 10 years. Then it will be completely reconditioned.

The machines used for this maintenance also will carve out new and bigger storage vaults. Equipment and tools stored in them don't rust, and food keeps indefinitely. With the techniques developed to build Camp Century, the engineers say they could hack out great ice caves to store surplus crops for use by

CONTINUED

## What the POWERFUL Porter-Cable MODEL 66 SAW can do...



This portable power saw is the workhorse in any shop... built with professional features for top performance; converts to stationary saw with accessory saw table. Do a multitude of cutting tasks with wide variety of available blades.



**POCKET CUTS**—Cuts openings quickly and easily in existing walls for windows, medicine cabinets, heat ducts, etc.



**BEVEL CUTS**—Model 66 bevel cuts any angle from 0° to 45°—in 2" dressed lumber. Calibrated quadrant for accurate angles.



**KICKPROOF CLUTCH**—Automatically puts saw into "neutral" if it jams or pinches in the cut. Prevents kickback for all around safety.



**TELESCOPING GUARD**—New design of telescoping guard eliminates jamming and "drag" at the start and during any type cut.

**Porter-Cable**  
*Quality Power Tools*

**FREE GUIDE...** send for complete Porter-Cable POWER TOOL Guide.

Porter-Cable Machine Co.  
6152 Marcellus Street, Syracuse 4, N. Y.  
Please send me FREE copy of your illustrated Power Tool Guide.

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ ZONE \_\_\_\_\_ STATE \_\_\_\_\_





## City Under Ice

future generations in times of famine.

**Why a Camp Century?** The Greenland icecap, with a big, permanent supply base at Thule, is the ideal laboratory for studying snow and ice. Aside from weather implications, these are two elements we will be living with more and more. The entire Distant Early Warning radar network (DEW line) lies above the Arctic Circle—from the Kuriles at the western tip of Alaska, across Canada and Greenland. Lessons learned in the North Polar areas can be applied in the Antarctic, now increasingly important.

Greenland, with 708,000 square miles of icecap, two miles deep at its crest, is the birthplace of weather for much of the Northern Hemisphere. By drilling and bringing up core samples of ice formed through the ages, scientists can study the history of snowfalls and get information on the movement of air masses covering thousands of years.

"This information," says Dr. Henri Bader, chief scientist of the Army's Snow, Ice, and Permafrost Establishment, "will enable us to make fairly accurate predictions on future weather cycles."

**Air samples from the past**, preserved as bubbles, are trapped in these ice samples. One Camp Century project is to try to determine how much air pollution has increased since the Industrial Revolution of the 18th Century introduced man-made smog. Ice cores from a depth of 160 feet contained volcanic dust from the great Krakatoa eruption of 1883 in the Dutch East Indies. And in the three-foot layers of snow that are deposited on the icecap each year, there is a permanent annual record of atomic fallout since Hiroshima.

This year-by-year accumulation of snow-become-ice is easily identified and accurately dated, somewhat as rings tell the age of a tree.

Samples of ice formed from snow that fell when Eric the Red set foot in Greenland in the year 982 already have been studied by scientists. With new thermal drilling equipment that will be used at Camp Century, they hope to go down 10,000 feet. The ice they then bring up will date back beyond the dawn of history—to the days when the footprints of Stone Age man were fresh upon the earth.

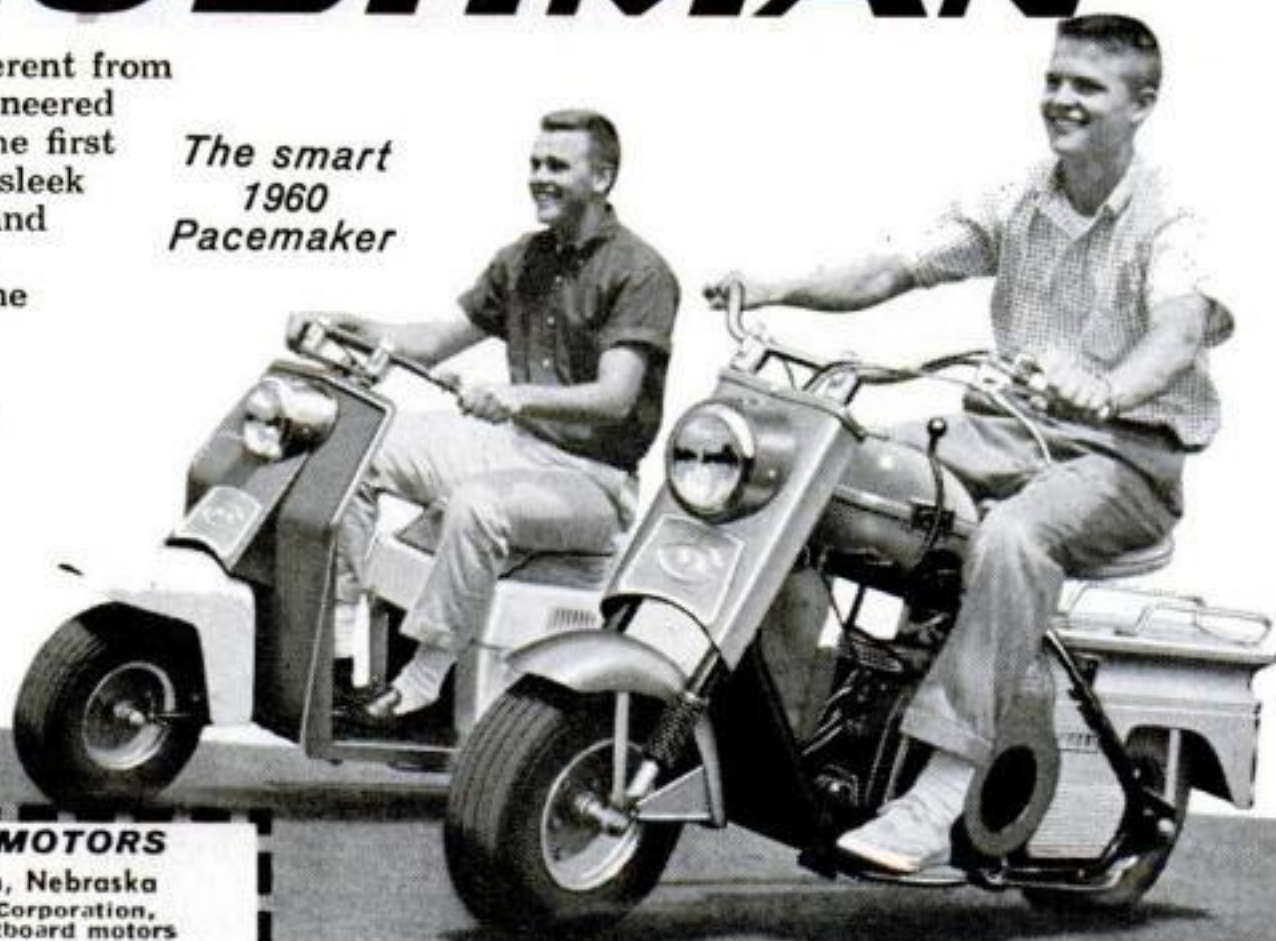
## For fun, adventure... **GO CUSHMAN®**

The road looks excitingly different from the saddle of a superbly engineered Cushman scooter, for years the first choice of young America for sleek styling, dynamic ruggedness and safe roadability. Dependable Cushman Husky 4-cycle engine delivers up to 100 miles per gallon, for an operating cost of less than a penny per mile.

**Sold and serviced nationally**

**Ask your dealer for  
FREE demonstration  
or write for colorful booklet**

*The smart  
1960  
Pacemaker*



*The dynamic 1960 Super Eagle*



### **CUSHMAN MOTORS**

1035 No. 21st, Lincoln, Nebraska

A subsidiary of Outboard Marine Corporation,  
maker of Johnson and Evinrude outboard motors

Please send Scooter Booklet.

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_



# GET BOTH HOME PROJECT BOOKS—FREE!



1. **"101 HOME IDEAS"**—24 pages, many in full color, feature home-building, remodeling and decorating ideas using wood paneling. For living rooms, dens, playrooms, dining and kitchen areas, storage and utility rooms, bathrooms, bedrooms . . . traditional and contemporary. Tips on choosing grades, species, patterns to fit your way of living. Section on built-ins, finishes and effects.



2. **HOW TO COLOR-FINISH WOOD PANELING** in bright or pastel shades. "Nature Makes News" features full-color photos of wood-paneled interiors. Ideas on unusual colors, textures, ways of installing paneling for exciting effects. How-to-do-it instructions cover sanding, sealing, choosing, mixing and applying colors, highlighting grain and knots, finish coats, maintenance and care.

Mail coupon to **WESTERN PINE ASSOCIATION**

DEPT. 429-L, YEON BLDG., PORTLAND 4, OREGON

YOUR NAME \_\_\_\_\_ STREET ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ ZONE \_\_\_\_\_ STATE \_\_\_\_\_



## GENUINE ALNICO MAGNETS

**AMAZING, PERMANENT, NON-ELECTRIC. HIGHLY PRACTICAL.** Conduct interesting experiments. Hundreds of uses. Retrieve valuable steel items such as guns, tackle from fresh or salt water; tools from tanks & drains. **GUARANTEED.** Try any magnet one week. Money back if you are not well-pleased.

No. S-710 (Wt. 53 oz.) Has pull of 225 lbs. on steel block.....\$18.00  
No. S-625 (Wt. 70 oz.) Has pull of 125 lbs. on steel block.....\$10.00  
No. S-575 (Wt. 18 oz.) Has pull of 75 lbs. on steel block.....\$ 7.00  
No. S-500 (Wt. 13 oz.) Has pull of 50 lbs. on steel block.....\$ 5.00  
No. S-90 (Wt. 5 oz.) Has pull of 15 lbs. on steel block.....\$ 3.50  
No. S-102 Pocket Magnet. 5 lb. pull. 2 for.....\$ 1.50  
No. S-47 Hot Pad Magnets. 10 for \$1.00.....50 for \$ 4.87  
No. S-35 Hobbyist assortment of 8 magnets.....\$ 2.00

Send M.O. or check. We pay postage. Sorry no C.O.D.'s.

MIAMI MAGNET COMPANY, 3240 N.W. 27th Ave., Miami 42, Fla.

## FIBERGLASS or PLYWOOD

\$41.95 Up, Frt. Pd.

EASY  
TERMS  
FREE 1960  
CATALOG

Cruisers, runabouts, convertibles, fishing. Pre-assembled, pre-formed units. Perfect assembly by anyone. Equal factory-built. Save you 1/2 to 2/3. Catalog has natural color photos, details; paint, trailers, accessories, Fiberglass supplies. WRITE TODAY.

## LUGER BOAT KITS

Dept. A-2, 9200 Access Rd., Minneapolis 20, Minn.



50 Models  
8—18 Ft.

ever  
work  
with  
hard woods?



**SURFORM tools  
work 'em easier**

Working hard woods—getting the exact contour, the smooth shape, or the delicate curve—is a lot easier with SURFORM tools. Pocket tool, new drum tool, all SURFORM tools—work quickly and easily on all kinds of wood, asphalt tile, composition boards, sheet rock, aluminum and other non-ferrous metals.



Making rabbet cut  
with SURFORM Drum

For free folder on miracle speed SURFORM® tools, write Stanley Tools, Dep't. 6302, New Britain, Conn.

**STANLEY®**



# Atlas 12" LATHE

Greatest value  
in its Field!



**Greater capacity . . . greater work range for production, service and hobby work.**

Atlas 12" precision lathes handle every job faster and better, and, for sound reasons. They give you greater capacity, versatility and performance than has ever before been available at or near their low cost. Compare their features:

- (1) 12 1/4" swing over bed, 12" swing over saddle wings, 8" over cross slide, up to 36" between centers.
- (2) Timken tapered roller bearings.
- (3) 16 spindle speeds, reversible power cross feed and longitudinal feed.
- (4) Wide thread cutting range.
- (5) Complete V-Belt drive for full power transmission.
- (6) Heavy beds with ways precision ground to within .001" in all planes.

These and other big lathe features are standard equipment on *all* Atlas 12" lathes. Available in bench models with standard change gears or quick-change gears, and in two underneath drive models with pedestal base, as illustrated. See them at your Atlas dealer's, or write for NEW CATALOG.

**PRICES START AT \$340  
F.O.B. FACTORY**



**Atlas Press Company**  
2-25 N. Pitcher St., Kalamazoo, Mich.

**QUALITY MACHINE TOOLS SINCE 1911**

## 10,000 Miles in a Falcon

[Continued from page 79]

for even a six-footer like me to get into.

*Francis:* But the driver's-seat travel is not for a short guy like me. I had to put a cushion behind me to reach the pedals, and then the bottom of the wheel was in my stomach.

*Rowsome:* Nobody has mentioned the parking brake. It takes a strong pull to set it.

*Mann:* The trunk is surprisingly big. That's a comfort for a family the size of mine on a trip. And the heater is a blast furnace. The front seat's as hard as a board, though.

*Comstock:* The ash tray's big enough for a pipe smoker. Overall, it seems to me, we're not doing the Falcon justice on the comfort score. I couldn't have maintained that 556-mile daily average of mine if it hadn't been pretty comfortable.

### The Styling

*Allaway:* For my taste, the Falcon is the handsomest of all the U. S. compacts.

*Francis:* For mine, give me the Corvair any day. The Falcon is a scaled-down standard Ford. It loses attractiveness in the shrinkage.

### In Conclusion

*Lockett:* For what it's intended for—a smallish and really economical car of limited performance—the Falcon fills the bill.

*Rowsome:* It's a mannerly, agreeable, easy-to-step-into-and-drive, trouble-free, docile, comfortable, spacious, low-performance car. And a bit unexciting.

*Comstock:* On a chart covering items of driver comfort, safety factors, and my subjective responses to styling and the creature comforts, I find that I marked 16 of them excellent, 16 good, five fair and only three poor.

*Mann:* It's attractive and comfortable transportation in the big-for-its-economy, family-size package.

*Allaway:* I met the Falcon in the worst way—plunging it into after-work, after-dark traffic, without being checked out in it. Yet I felt at ease immediately. It's a handy car for shopping and for ferrying kids around.

*Francis:* For the conservative motorist who abhors the unconventional, this is the perfect car.



# Free Boat Selector shows ultra-new designs



Model "Tangler"



Packed with factual information helpful to everyone interested in boating.



America's Best Built Boats

● Rakish, jaunty, streamlined . . . smart as tomorrow's sport cars, the new fiber glass and aluminum runabouts in the Yacht Club Fleet bring dashing appearance and flashing performance to Aluma Craft's accepted fine quality.

See these new beauties in the 1960 Boat Selector which also shows the Cottage Fleet of family boats as well as the popular Fishing and Wilderness Fleets. Each model pictured and described with full specifications, capacities, recommended horsepower, to guide your selection. Write for your free copy today.

## ALUMA CRAFT BOAT COMPANY

1521 N.E. Central Avenue  
Minneapolis, Minnesota

Gentlemen without obligation send me free 1960 Boat Selector Catalog.

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_

## FISHERMEN

Make your own  
SINKERS  
JIGS SQUIDS  
CASTING  
and SPINNING  
LURES

## It's fun, it's easy with Sweet's ALUMINUM MOLDS

Molds for fresh and salt water fishermen. Handled and hinged for easy, fast operation. Over 100 types, 500 sizes. Write for FREE catalogue TODAY.

AS LOW AS  
**2.95**  
per mold

**SWEET'S MOLDS**  
TONAWANDA 31, N. Y.



FOR PANELING... BUILT-INS... CABINETS... FURNITURE

## Wood Finishing

made easy

The complete wood finish in one can.

Wherever paints are sold



In spray can, too

## NOW! a hi-compression staple gun for only \$4.95



With Exclusive Push-button Loading and Built-In Staple Extractor.

Indispensable for home use...and never before priced so low! This compact, all steel, powerful SWINGLINE 101 staple gun is ideal for insulation, carpentry, upholstery, screening, wire fencing, plus thousands of other uses. Handle locks to fit pocket. Lightweight, maneuverable, jam-proof! Staple sizes  $\frac{1}{4}$ " ,  $\frac{5}{16}$ ". Send for FREE book—"Tips for Tacking".

**Swingline® INC.**

Dept. PS-2-O Long Island City 1, New York



# SHOWER DOORS FOR UNDER \$35



## with Reynolds DO-IT-YOURSELF ALUMINUM

Make your own attractive aluminum and glass shower doors. Pay under \$35 for materials. Same high quality doors that cost \$70 to \$80 (installed) in most retail outlets. Easy to make in hours with ordinary woodworking tools.



Write for free plans,  
how-to literature  
and check-list of over  
40 fascinating  
Reynolds Do-It-Yourself  
Aluminum Projects.

Look for the Reynolds  
DIYA display rack at  
most hardware and build-  
ing supply stores.

**Reynolds Metals Co. • Richmond 18, Va.**

Please send Reynolds Do-It-Yourself Alumi-  
num How-To kit with FREE shower door  
plans.

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_

Zone \_\_\_\_\_

State \_\_\_\_\_

Dept. PS

## Magnetic Motor Looks Like Steamer

[Continued from page 151]

ameled magnet wire. Feed the wire evenly across the coil. If it breaks, you can splice it. Make a small soldered joint and insulate it with nail polish.

*The coil cover* should be made of steel to continue the magnetic lines of flux. The fins should be aluminum—it dissipates heat most rapidly.

You can make all six fins at once by screwing a stack of aluminum sheets to a plywood faceplate. Bore the stack about .001" less than the o. d. of the coil cover, then shape the fins with snips and file.

Heat a fin with a torch to expand it. Slip the hot fin in place and let it cool. It'll be a tight fit.

Or you can bore the fins oversize and hold them in place with epoxy adhesive.

The engine's "valves"—the breaker points—can be adapted from an old relay, thermostat, or auto-ignition points.

You can build the assembly from scratch by riveting contact points to .016" spring steel as shown. You'll have to anneal the spring to work it and re-temper it afterwards.

*The last step* is "grinding" the cam and timing the engine. It also can be the most frustrating one. Understanding the engine's operation will help.

An alternating-current solenoid attracts a core toward its center. At top dead center, the engine's piston protrudes above the cylinder. Closing the points energizes the cylinder, attracting the piston downward toward the coil's center.

At midstroke—when the tops of the cylinder and piston are flush—the centers of coil and core coincide. The points must open to allow the piston to coast to the bottom of the stroke.

Re-energizing the coil attracts the piston upward again. Then the power must be shut off at midstroke. The piston coasts back to top dead center, ready for the next cycle.

*Let the engine dictate the cam's shape.* Mount a blank on the shaft and position the point assembly under it. Set the points so they're closed when the roller is against the blank face.

With the piston slightly before top dead center, scribe a line on the cam through the center lines of the shaft and the roller. This is where the points should close.



### **Magnetic Motor Looks Like a Steam Engine**

Rotate the shaft until the piston top is even with the cylinder top—midstroke. This is where the points should open. Mark the cam again. Repeat the procedure on the up stroke.

The four marks on the cam indicate the limits of the cam lobes. With a rotary file in the drill press, cut out the metal between the lobe marks. Don't cut right to the lines, however. Leave a little metal for final touch-up.

At this stage, each engine is different. Final contour is a cut-and-try project.

The pilot light will help by telling you when the points are closed.

A curved slot in the cam will permit revolving it about 90 degrees. This puts the power impulses at opposite ends of the stroke—and reverses the engine.

The engine should start by itself if the piston is placed slightly past TDC—a good check for excessive friction.

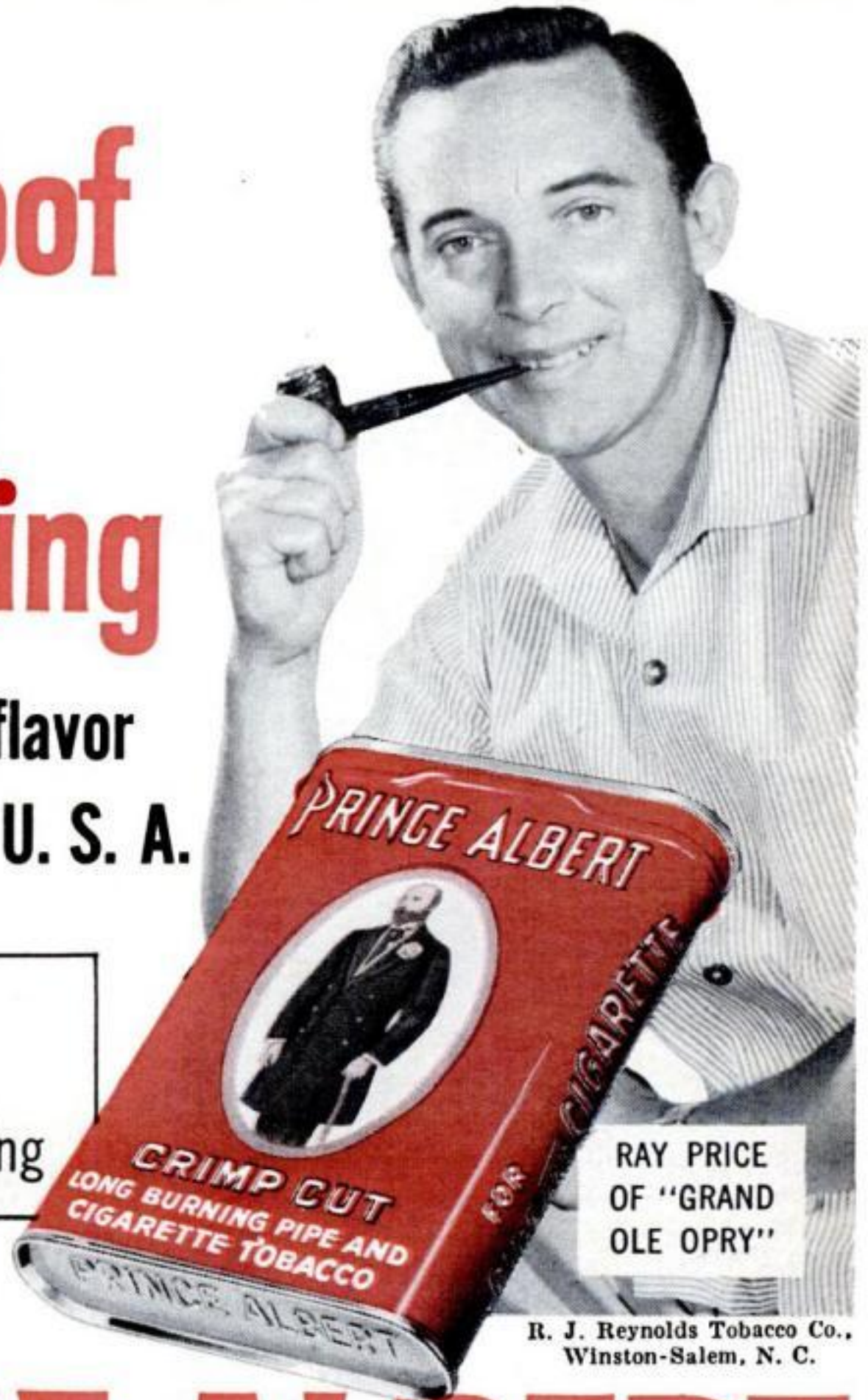
Return the piston to this self-starting position each time you turn it off. It will remain ready to show off its talents—and yours.

# The proof is in the puffing

and P. A. has the flavor  
most favored in the U. S. A.

- always tastes fresh
- mild, mellow flavor
- cool 'n' steady burning

**America's Largest-Selling  
Smoking Tobacco!**



R. J. Reynolds Tobacco Co.,  
Winston-Salem, N. C.

# PRINCE ALBERT





You Need  
All These  
Basic Tools

...MOST  
OF  
ALL

**CHAN NEL LOCK**®

Ask any skilled electrician or auto mechanic about CHANNELLOCK Pliers. He'll tell you they're the handiest pliers of them all . . . basic tools he wouldn't be without. And this same all 'round usefulness will help you do hundreds of jobs . . . faster, easier. Be sure your basic tools include genuine CHANNELLOCK Pliers. Get them at your tool supplier's. If he's out of them, ask him to order for you. Available in three jaw capacities:  $\frac{7}{8}$ " ,  $1\frac{1}{2}$ " and 2".



Use it as a plier

Use it as a wrench



Write for Catalog of Complete Line of Pliers

**CHAMPION DEARMENT TOOL COMPANY**

MEADVILLE 2, PENNSYLVANIA

## TV Goes to Tape

[Continued from page 103]

a TV signal and show instead streaks of white, gray, or black dots ("dropout").

Signals from the television camera are transferred to video tape through tiny recording heads that are electromagnets. They magnetize the iron-oxide particles as the tape rolls past, leaving an invisible magnetic pattern that matches the signal from the camera.

When the tape is played back, the recording process is reversed. The magnetic pattern in the tape induces an electric current in the coils of the recording heads. This current is identical to the original signal from the camera.

*What the tape recorder does*, in essence, is package all the camera's signals and hold them until you are to see them. When that time comes, the tape is played back. It releases the stored signals to the air, and you see them just as if they were coming straight from the camera.

Well, almost. Near-perfect recording and reproduction are possible, but seldom achieved in routine telecasting. The setup is so complex that something usually goes slightly haywire at least once during a show. The defects that creep in are peculiar to tape, and if you know what to look for you can usually spot a taped show by their appearance. For example:

- **Dropouts.** Imperfections in the magnetic coating on the tape produce white horizontal streaks, irregularly spaced.
- **Head switching transients.** These look like auto-ignition interference, but can be either white or black. They streak straight across the picture, making evenly spaced bands. The cause is faulty switching as one after another of the four reproducing heads takes its turn in picking up the signal off the tape.
- **Waterfall.** The reproducing heads must rotate very rapidly. If their bearings wear, the picture moves slightly to create a shimmering effect.

There are lots of other things that can go wrong (see pictures on p. 102 for examples). But the general quality of taped TV is excellent, matched only by the very best of movies made for television, and far superior to kines (movies shot off the face of a TV screen).

*Secret of success.* High quality in picture and performance is the reason usually given for the rapid switchover to





# Gone fishin'... on a HARLEY-DAVIDSON TOPPER

**HARLEY-DAVIDSON MOTOR CO.**  
Dept. PS, Milwaukee 1, Wisconsin

Send me more information on  
the Harley-Davidson Topper.

Name.....Age.....

Address.....

Angling for your favorite trout stream is twice the fun on a Harley-Davidson Topper. Plenty of room in this scooter for meal and creel, too. Fishing is just one of many activities that give more pleasure because you get there on a Topper.

The Topper boasts a host of new scootering features developed by the world's leading builder of 2-wheeled vehicles—see it at your Harley-Davidson dealer or mail coupon for colorful folder.

## GO-CART PLANS

Simplified plans for building your own cart from easy to find and inexpensive materials. Mail 25¢ to CARTS, Leeton, Mo.



**When Writing to Advertisers  
Please Mention Popular Science**

## Roam with Romer

...to hidden, far-away places...

Hunt and fish as never before.  
A Romer to fit every pickup.



Write today for Romer's  
Free TRAVEL PACKET.  
Illustrated details of coach, and nearest  
dealer. Dealers write.

**Romer**  
Honorbuilt Trailer Manufacturing Co.  
756 Hansen Ave., Lakeview,  
Riverside Co., Calif.  
Siegmond Werner Inc. Division  
225 Belleville Ave.,  
Bloomfield, N. J.

## NEW INSULATION FOR MASONRY WALLS!

- WATER-REPELLENT
- CUTS HEATING COSTS  
—doubles insulating  
value of walls
- EASILY INSTALLED

At last there's an insulation to go into cores of concrete block, or into cavities in brick wall construction. New Zonolite Masonry Fill doubles insulating value, installs in a jiffy, stays permanently dry. Costs only a few cents a foot, gives lasting comfort, saves fuel. Ideal for homes, garages, breezeways, commercial or farm buildings.

**ZONOLITE®**  
Masonry Fill Insulation



**ZONOLITE COMPANY, Dept. PS-20**  
135 South La Salle Street, Chicago 3, Illinois  
Please rush booklet MF-2 on  
Zonolite Masonry Fill Insulation.

Name.....

Address.....

City & Zone.....State.....

**AT LUMBER & BUILDING SUPPLY DEALERS'**



*America's finest*

# BOLENS

*outdoor*

# BOLENS

*power equipment*

# BOLENS



RIDE-A-MATIC TRACTOR,  
38" Rotary Mower

BIG TRACTOR performance and styling, small tractor convenience and economy . . . that's the new 7 hp Bolens Ride-a-matic. Pushbutton starting, Versa-Matic drive, automotive steering and differential, 21 attachments to help you ride your way through work all year 'round. Demonstration proves it . . . ask for one! No obligation!


**BOLENS**

Use this coupon to get free full-color literature, name of your local Bolens dealer.

Check catalogs you want, mail coupon with your name and address.

- |  |   |
|--|---|
| <input type="checkbox"/> Riding & Walking Mowers | <input type="checkbox"/> New FMC Orbit-Air Mowers |
| <input type="checkbox"/> Utility Tractors        | <input type="checkbox"/> "Convertibles"           |
| <input type="checkbox"/> Rotary Tillers          | <input type="checkbox"/> Chain Saws               |

**BOLENS PRODUCTS DIVISION**

 Food Machinery & Chemical Corporation  
Dept. D-2, Port Washington, Wisconsin

## TV Goes to Tape

tape. TV viewers saw their first bit of video tape only three years ago (2½ minutes of the Jonathan Winters show, October 23, 1956). Now NBC tapes more than 30 shows a week, CBS about 40. U. S. stations have bought more than 250 Ampex machines (at \$45,000 each, plus \$250 for every reel of raw tape).

The quality claim is true enough, but tight-fisted cost accounting also figures in this success story. CBS estimates that taping General Electric Theater was 30 percent cheaper than making movies of it.

The money saving comes from time saving in a business where people get paid by the hour at very fancy rates. One tightly budgeted but widely praised series of two-hour dramas—The Play of the Week—is completely taped, all edited and ready for telecasting, in just three days (not counting outside-the-studio rehearsals).

Tape's principal time-savers are two: (1) The show is edited while it is being shot (by switching cameras from the control room), not afterwards; and (2) processing is eliminated—you can see the results minutes after the cameras halt.

An unexpected bonus from tape showed up during a telecast of a championship pro-football game. It was being aired live, but simultaneously taped. Just before the winning touchdown in the final seconds of play, somebody tripped over a cable and kicked the show off the air. Yet TV fans didn't miss the exciting finale—they saw it a few minutes late, played back from the tape.

*Home tapes?* It has already occurred to engineers that it would be nice to provide you and me with a combination of TV camera and tape recorder that we could use to make home shows and play them back on our TV sets. To do this with present professional equipment would cost us around \$100,000. A tape maker has remarked that the cost will have to be cut more than 100 times before we'll even be interested.

Maybe that will happen within 10 years, he guessed. Argus recently put a small TV camera on sale for \$600. And RCA has developed a video-tape player that might cost around \$400. It will play back programs through a regular TV set, although it can't do any recording.—*Wesley S. Griswold and Martin Mann.*



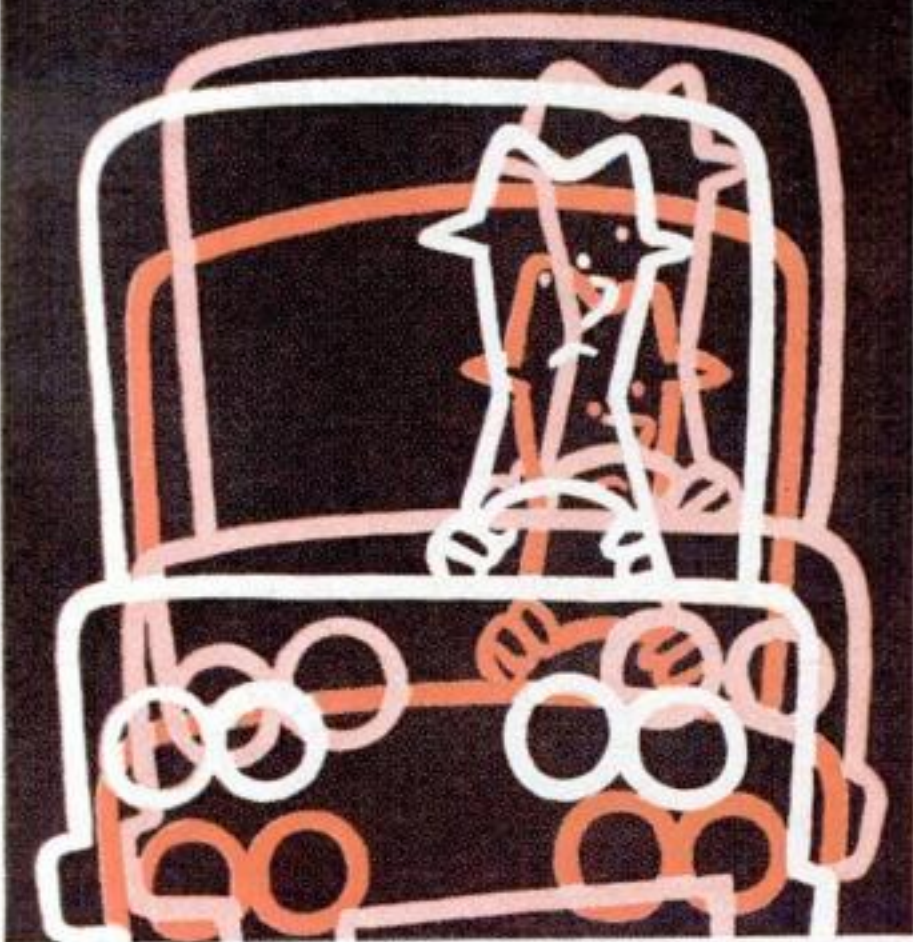


**PAVEMENT POLISHER.** Here's a combination vacuum and floor polisher that not only cleans a street but puts a shine on the stones. It's used above in front of St. Mark's Basilica in Venice.



**PLENTY TO SEE.** The U.S. Department of Agriculture keeps cows in clear-plastic stalls at its research center at Beltsville, Md. This offsets claustrophobia, makes cows give better milk.

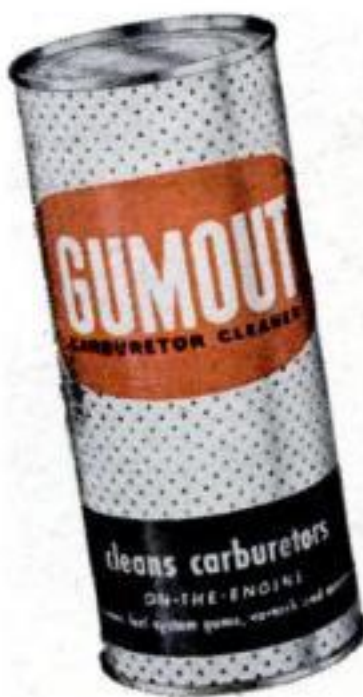
**When rough idling  
shakes you up...**



## HOW LONG SINCE YOU CLEANED YOUR CARBURETOR WITH **GUMOUT**

Ever notice that your car doesn't idle as smoothly as it once did? Maybe it stalls occasionally. Might be a little harder to start. Or it lacks pep and power. All because your carburetor is dirty!

### CLEAN YOUR CARBURETOR WITH GUMOUT



Just add GUMOUT to your gas tank. *Only* GUMOUT dissolves gum and varnish *completely* . . . restores engine power, stops gasoline waste. Don't take chances with substitutes. Insist on GUMOUT. Every car needs GUMOUT!

On sale at most service stations  
and auto supply stores.

**GUMOUT • CLEVELAND 4 • OHIO**



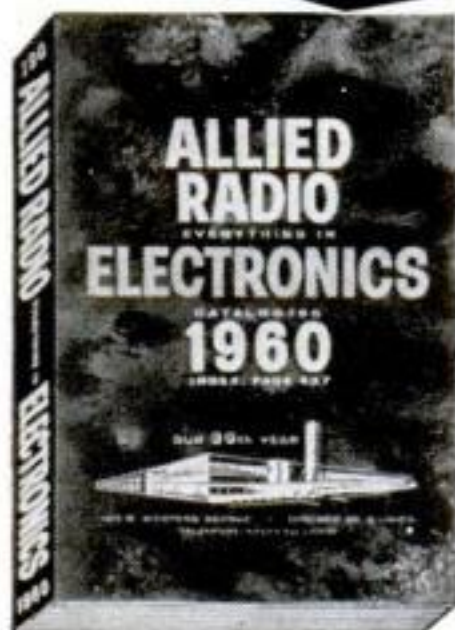


**BUILD THE BEST!**

build quality money-saving

**knight-kits®**

A PRODUCT OF ALLIED RADIO



see them all in  
**ALLIED'S**  
1960 ELECTRONIC  
SUPPLY CATALOG

**FREE**

build your own...  
it's easy...it's fun!  
**SAVE UP TO 50%**

HI-FI  
KITS



INSTRUMENT  
KITS



HOBBY KITS



HAM  
KITS

world's  
largest  
stocks



See the 1960 KNIGHT-KIT line—available only from ALLIED. KNIGHT-KITS are lowest in cost, convenience-engineered for easiest assembly—the only kits with money-back guaranteed specifications. Send today for the 1960 ALLIED Catalog—select your KNIGHT-KITS—and...

**SAVE ON EVERYTHING  
IN ELECTRONICS**

Get more for your money in Stereo hi-fi systems and components; save on recorders and tape; Amateur station equipment; TV tubes, antennas, accessories; test instruments; electronic parts, tubes, transistors, tools, books. Send today for your FREE 1960 ALLIED Catalog!

**EASIEST TERMS**  
only \$2 down on  
orders up to \$50

**FREE  
catalog**

**ALLIED RADIO**

100 N. Western Ave., Dept. 27-B, Chicago 80, Ill.

☐ Rush FREE 1960 ALLIED Catalog

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

## The Truth About Truth Serum

[Continued from page 108]

subconscious motive for accusing him. Bitter at having been rejected by a number of suitors, she was seeking revenge on them all by making a scapegoat of one.

The judge said he was fully aware that testimony obtained with the use of sodium amytal was not foolproof, but in this case it was too convincing to be ignored. He threw out the case.

In 1959, the same drug played a crucial role in a civil suit. Five years earlier, a young man named John Freeman was found critically injured in the railroad yards at Columbus, Ohio. Both his legs had been severed.

When he had recovered enough to be questioned, shock had wiped out memory of the 36 hours before the accident.

The amnesia persisted. Two months later, he asked Dr. Maurice Rusoff, a psychotherapist, to give him a sodium-amytal interview. In the course of it, Freeman was able to recall all the shock-blocked details:

He and a pal had been watching a college football game on television in a bar. They joined a couple of girls. The four visited a special train that was taking one team and its rooters back home, and joined a lively group in one of the cars. When the train started, Freeman jumped off and began crossing the tracks. A yard conductor saw him and ordered him away. Freeman objected. The conductor pushed him and he fell, hurting his back so that he couldn't get up. A train rolled over his legs.

Fortified with these drug-restored memories, Freeman sued the railroad. By the time the case got to court, the conductor had been dead three years.

Defense attorneys strongly opposed admitting the truth-serum testimony as evidence. But the judge allowed Freeman's lawyers to call in Dr. Rusoff and other specialists to describe the characteristics of sodium amytal and their clinical experience with it. The jury was won in a rush. Though it whittled down the award, it decided in favor of Freeman.

## When does it work best?

It releases unconsciously suppressed information far more easily than facts that a person is determined to hide. So

CONTINUED



# SURPLUS SALE

GOVT. SURPLUS  
EXCESS INVENTORY  
BANKRUPT STOCK

## SURVEYING-LEVELING INSTRUMENTS

- Leading make, latest models, brand new guaranteed levels-transits at big saving. Wonderful values, all prepaid to you. Complete with tripod, case.
- Professional Level-Transit. \$196.50
- Professional Dumpy Level. \$155.00
- Contractor-Farmer Level. 53.59
- Grading Hand Level. 2.95



## BATTERY HYDRAULIC PUMP

- Item #920. New electric hydraulic pump. Use on lift trucks, loaders, etc.
- Operates from 12-v truck battery DC, 1000 p.s.i., 1 to 3 gpm. Inlet and outlet ports, 3/4". Size 15"x7"x6". 35 lbs. New, perfect. Use for plow lifts, wagon tilts, etc. Cost Govt. \$175.

SALE \$16.95 FOB

## PORTABLE GOVT. AIR TANK

- Item #472. New stainless steel 400-lb. pressure unit with hose, chuck, gauge, blow gun.
- Fill tires, spray chemicals, blow dust, etc.



Fill any gas station. Wt. 12 lbs. Govt. cost \$33.50. SALE \$14.95 FOB

## AIR COMPRESSOR BARGAINS

- Paint, clean, spray, etc. Build your own fine outfit. Save 60%. Leading make units.
- Item #460. Twin cyl. piston compressor, 150 PSI, 11 cfm. Size 12x10x12 in. Wt. 40 lbs. List \$62.50. SALE \$54.75 FOB
- Item #450. Deluxe kit. 1-cyl. compressor tank, gauge, paint gun, etc. SPECIAL \$43.91 FOB (Many other air item bargains.)



## GOLF CAR MOTOR

- Item #573. Runs on 12-v batt. Build golf or car motor, electric auto. Powerful gear reduction speed 25-80 rpm. Easily reversible. 100s applications. Wt. 35 lbs. Govt. cost \$250. SALE \$18.95 \$35.91 FOB



## ARMY PLANT

- Item #669. 3000-4000-w. 115-v. 60-c plant, 4 cyl. water cooled engine. Finest Hobart generator — instrument panel — push button start. Army's finest plant. When power fails, generate your own. Wt. 600 lbs. Govt. cost \$1248.

SALE \$349.50 FOB

## STORAGE BATTERY WINCH

- Item #331. Powerful fully reversible ball-bearing gear reduction winch. 1000-2000 lb. pull. Use on 6 or 12-v battery. Holds 40' of 1/4" cable. For trucks, docks, boats. Govt. cost \$280.

SALE \$46.75 FOB



## HIGH-VOLTAGE SPARK COIL

- Item #2260. Powerful laboratory expensive vibrating type spark coil. 10,000 volt spark from 12-volt AC or DC. Jumps gap.
- Use for ignition booster, burglar protection, practical joke (wired door knobs), etc. Govt. cost \$13.50.

SALE \$4.39 Ppd.



## AC POWER SOLENOID

- Item #2271. Wonderful very powerful 115-v 60-c solenoid. Tremendous pull. Use to operate latches, levers, etc. Has 1" stroke. Easy to mount and use.

Size 2"x3". Wt. 1 lb. List \$8.25. SALE \$3.49 Ppd.

## 115-W WATER HEATING UNIT

- Item #1127. Expensive finest Westinghouse water heating elements. Use for heating water, oil, etc. Makes ideal stock tank heater. Totally enclosed. 1 1/4" pipe threads. 3 heats—800, 400, 200 watts. Very rugged. Real buy. Govt. cost \$17.90.

SALE \$3.95 Ppd.

## STANDARD DIAL PHONE

- Item #715. Modern hi-efficiency attractive dial phone. Use for extension to main line on private system. Use several for complete private system, etc. Complete. Work on any system. Govt. cost \$25.

SALE \$9.95 Ppd.



## SPECIAL OF THE MONTH!



## SELF PRIMING PUMP

- Item #280. New leading make Govt. unit. Self priming. High capacity. Fine for basement sumps, ideal bilge (boat) pump, fuel transfer, contractor use, etc. Capacity 12-40 gpm.
- Bronze fitted, self adjusting vanes. 1 3/4" (o.d.) inlet and outlet. Wt. 51 lbs.
- Kit of spare parts free.

List \$65.50. SALE \$24.91 FOB

## FISH-WORM AC SHOCKER

- Item #670. Harvest worms, clear private ponds of coarse fish. Powerful 110-v AC hand geared generator creates powerful electric field in ground or water. Amazing results.
- Also fascinating for experimental—use for fun at parties. Has Super-Alnico magnets. Govt. cost over \$12.

SALE \$3.89 Ppd.



## HYDRAULIC EQUIPMENT BARGAINS

- Savings to 80%. Build loaders, diggers, presses, etc. All brand new.
- Hand Pump (1000 psi).... \$10.95 Ppd.
  - Control Valve (2-way).... 18.00 Ppd.
  - DA-16" Stroke Cyl..... 17.41 FOB
  - Hyd. Press-Gauge (1500 lb.) 3.49 Ppd.
  - SA-144" Stroke Cyl..... 79.50 FOB
  - DA-Servo Cyl 6" Stroke.... 5.79 Ppd.
  - 12 GPM Pump (400 RPM).... 45.50 Ppd.
- Save 30% on finest winches, hoists, etc. For trucks, boats, farms, etc.
- 1000-lb. Hand Winch 8.95 Ppd.
  - Boat, dock, utility hand winch, 1-4 gear ratio, 1500 lb. \$19.95
  - 2000-lb. Hand Winch 30.95 FOB
  - 2000-lb. Worm Winch 36.95 FOB
  - 2000-lb. Hand Hoist 19.71 FOB
  - 3000-lb. Snatch Block 6.95 FOB



FREE  
CAT-  
ALOG

Electronics, Power Tools, Binoculars, Hydraulics, Power Plants, Air Compressors and thousands of other items.

**SURPLUS CENTER**  
LINCOLN, NEBR. DEPT 824

SEE PAGE 249  
FOR WINNERS OF  
THE SPLIT-LEVEL  
WORKBENCH CONTEST

## PAGE FOR TILLING PLOWING MOWING

A FULL LINE — 2 to 9 HP  
with complete gear drive and reverse  
FREE CATALOG • LOW PRICES • EASY TERMS  
Over 40 years experience  
OVER 60 ATTACHMENTS AVAILABLE!

**PAGE** 1916 S. 81 ST.  
MILW., WISC.



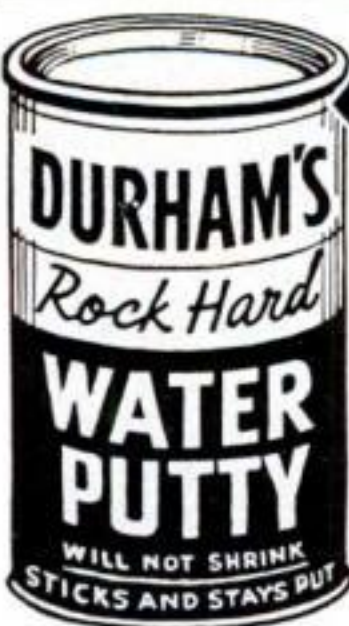
BUY  
DIRECT

The Modern PLASTIC  
for lasting Home Repairs

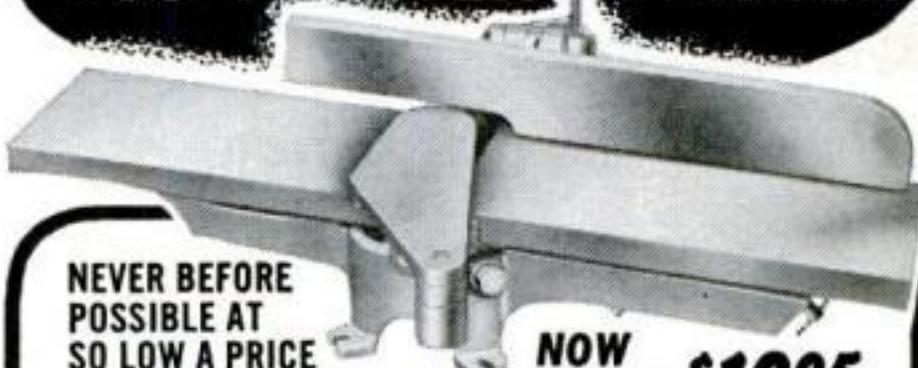
PERMANENTLY mends cracks or holes in wood, tile, stone or plaster. Sticks and stays put—Does not chip, shrink or fall out. Easy to use. Economical. Mold it, chisel it, polish or paint it. The big 4-lb. can is obtainable from your lumber, paint or hardware dealer at \$1.40; or will be shipped direct postpaid (in U. S.) for \$1.75. Complete satisfaction guaranteed or your money refunded. Order now.

**DONALD DURHAM CO.**

Box 805-U Des Moines, Iowa



## REVOLUTIONARY NEW DESIGN SAVES YOU \$20 TO \$40 4 1/8" JOINTER PLANER



NEVER BEFORE  
POSSIBLE AT  
SO LOW A PRICE

NOW  
ONLY \$1995

(shipped complete as shown)

## SOLD DIRECT FROM FACTORY

Patents pending on revolutionary new engineering developments make this bargain possible. This is a power plane with all the features of machine tools costing 3 times OUR PRICE. It planes, rabbets, bevels, aids beveling and glueing joints; is so rugged and durable we guarantee it unconditionally for ten years.

## SEE THESE QUALITY FEATURES

All cast iron and steel construction • Balanced steel cutter head • Hardened and ground knives • Precision ground cast iron tables • Rugged cast iron base • Table depth adjustable 0" to 3/8" • Cast fence with single action cam lock • Pat. lift-off aluminum guard • Big, full size—22" long • Shp. wt. 25 lbs.

Order By Mail — Sold Direct From Factory to You

OUR 30TH YEAR SEND \$19.95 CHECK OR M.O.  
SENT C.O.D. WITH \$3.00 DEPOSIT

(If not completely satisfied after ten days return for full refund.) Shipped express collect.

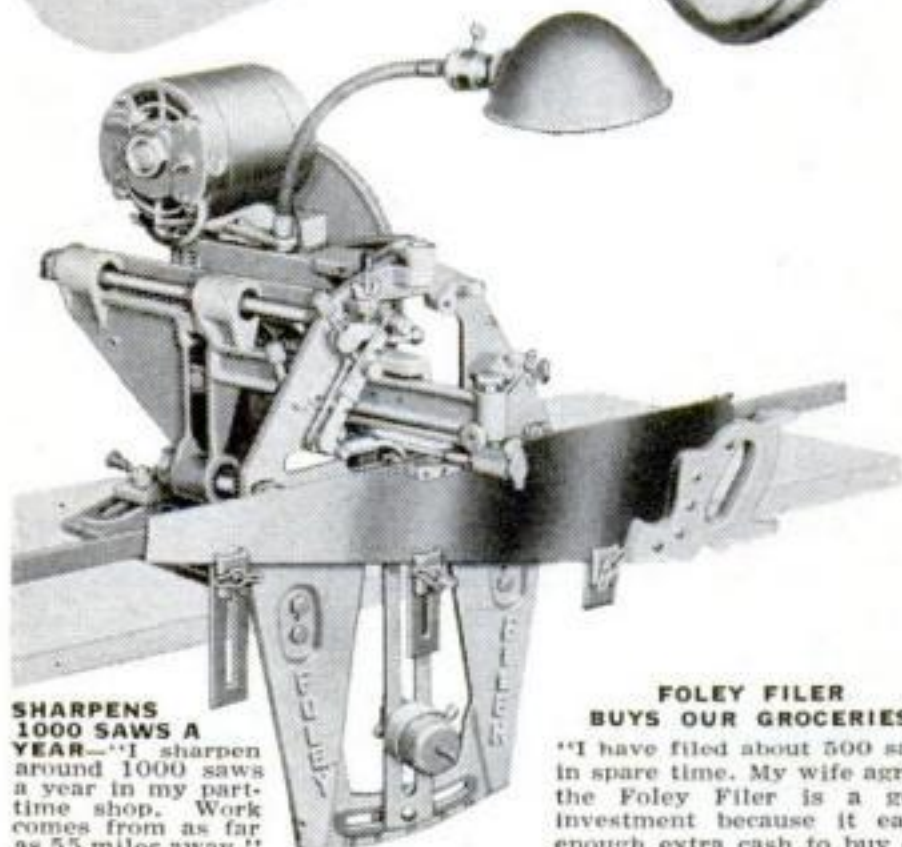
**AMERICAN MACHINE & TOOL CO., INC.**  
ROYERSFORD 54, PENNSYLVANIA



# FREE PLAN

Tells How To Start  
Your Own Business

## FILING SAWS



**SHARPENS  
1000 SAWS A  
YEAR**—"I sharpen  
around 1000 saws  
a year in my part-  
time shop. Work  
comes from as far  
as 55 miles away."  
—Joe H. Walker.

**FOLEY FILER  
BUYS OUR GROCERIES**  
"I have filed about 500 saws  
in spare time. My wife agrees  
the Foley Filer is a good  
investment because it earns  
enough extra cash to buy our  
groceries." — R. J. Kreuser.

### FOLEY FILED SAWS BRING NEW CUSTOMERS

Here is a steady repeat CASH business that pays from \$3 to \$6 an hour, and you can start in your own basement or garage in your spare time. Every saw you sharpen with the machine accuracy of the Foley Saw Filer is an ad that brings more customers. J. C. Deibert wrote us: "Since I got my Foley Filer five years ago, I have averaged 4 1/4 saws each day over all this time." Howard Kuhns says: "We operate 2 Foley Filers, and our business averages about 500 saws per month. The count last year was 5,798 saws."

The new model 200 Foley Saw Filer (shown above) is the first and only machine that automatically sharpens combination (rip and cross cut) circular saws—also all hand saws, band saws and crosscut circular saws. The adjustments are simple—there is no eyestrain—and you can start right away to turn out perfect cutting saws. Exclusive jointing action even up irregular teeth — old saws cut like new!

"**MONEY MAKING FACTS**" explains how you can get business from hardware stores, home owners, farmers, carpenters, schools, mills, factories, etc. Just think, with a modest investment, no overhead, no stock of goods to carry, you can start right in on a cash business that will help pay the rent, buy groceries, or a new car. Time Payments available; send coupon today for this practical money making plan. No salesman will call.



Send for **FREE BOOK**

**FOLEY MFG. CO., 219-0 Foley Bldg.,  
Minneapolis 18, Minn.**

Send me free book "MONEY MAKING FACTS" and  
TIME PAYMENT PLAN.

Name .....

Address .....

### The Truth About Truth Serum

said Dr. Michael M. Miller of Washington, D. C., after interviewing more than 200 defendants and psychiatric patients with the aid of sodium pentothal.

Earlier, Capt. Alfred O. Ludwig of the Army Medical Corps had reported that it was impossible to break down the falsehoods of desperate liars with truth serum. He had tried in the course of examining soldiers suspected of feigning mental or physical ills to avoid combat.

Other investigators have found that it works especially well with neurotic persons who have strong feelings of guilt, anxiety, or depression. Subconsciously, such a person wants the relief of confession or of self-punishment. When a barbiturate removes the conscious controls of a neurotic mind, it often lets loose a torrent of information.

It also works well in a case of true amnesia, when the victim is eager for help in recovering his lost memory.

### What are the serum's drawbacks?

One is that a person in a state of "altered consciousness" is extremely suggestible. He may tell not what is true but what he thinks his questioner wants to hear. Questions must therefore be phrased with great care.

If, for instance, the subject were asked, "You did kill Jane Doe, didn't you?" he might well say yes. But if he were asked, "Did you kill Jane Doe?" he would probably say no. And that answer could be the truth.

Another handicap to the use of truth serum is that there is no sure way to tell how fully under its influence a person may be—unless he's unmistakably unconscious and beyond questioning. If he is still able to talk, he may be only pretending to be unaware of what he is saying.

No two people have the same tolerance for the barbiturates, and an individual's reaction to one of the drugs can't be determined in advance. If a person is a heavy drinker, for instance, his tolerance will be exceptionally high.

For these reasons, authorities stress that testimony given under the influence of truth serum should never be accepted unless it can be corroborated by proper evidence.



# Professional Mechanics' TOOL CHEST FOR YOUR HOME WORKSHOP



This may be the lowest cost full-sized chest in America! 4 sliding drawers in blue-gray rugged steel cabinet. 26" x 12 1/2" x 12 1/2". Keep your valuable tools safe, clean and always at your fingertips.

**\$25<sup>90</sup>**

F.O.B. ST. PAUL

**HUOT MFG. CO.**

532 No. Wheeler St., St. Paul 4, Minn.

**FREE BULLETIN** describes this and 15 other models!



## THE BATTERY THAT'S USED IN GUIDED MISSILES NOW RELEASED AS GOVERNMENT SURPLUS



For Photography, Aircraft, Models, Searchlights, Radios, etc. **\$1.95 ea.**

Postpaid Sintered-plate Nickel-Cadmium alkaline storage batteries designed for "Nike" Missile and now surplus due to design change. A lifetime battery with no known limit of service (over 5000 recharges on test without loss of capacity). Other features: Virtually indestructible, compact & light-weight, withstands heavy shock and vibration. Flat voltage curve during discharge, retains charge year or more, high discharge rate up to 50 amps. for this cell, no corrosive fumes to harm clothing or equipment, spill-proof construction, discharge in any position, indefinite storage without deterioration, operates in temperatures -60° F to +200° F. Each cell is approx. 6 ampere hour capacity, nominal voltage per cell is 1.2 volts. (A 6 V. battery requires 5 cells.) Cell size 6" H. x 2" W. x 1 1/2" T. Wt. 6 oz. ea. Uses Potassium-Hydroxide (30%) electrolyte. Negligible loss during lifetime service. Add only distilled water once a year. A fraction of Government cost.

Used Test Cells.....\$1.95 ea. Postpaid

Brand New Cells.....2.95 ea. Postpaid

24 V. Battery (20 cells) in metal case...Used \$40.00, New \$60.00  
All cells guaranteed to your satisfaction or money refunded (less Postage). Plastic battery cases may have slight cracks—repaired easily with household cement or you may add 25c to insure uncracked cases for each cell.

**ESSE RADIO COMPANY, Dept. D4**

42 W. SOUTH STREET

INDIANAPOLIS 25, INDIANA



**FOR 1960**

More aluminum, lighter weight, better performance, beautiful styling. Still World's Lowest Priced Car. Drive it for 75c a week. Rider Agents Wanted. If no dealer near you send 25c for 32 page picture book, full details, dealer price, or send \$1 (refunded first order) for this and Service Manual plus Repair Manual and 15 5x7 photos of car and factory.

**MIDGET MOTORS CORPORATION, Athens 2, Ohio**

**4** SIMPLE, EASY-TO-USE **only 14<sup>75</sup>**  
**WAY WELDER** F.O.B.  
ANYONE CAN WELD, BRAZE, SOLDER, CUT,

HEAT MOST ANY METAL WITHOUT EXPERIENCE



Over 200,000 in use in homes, garages, farms, shops, factories everywhere. Save money—earn money, making and repairing auto bodies and parts, fenders, furniture and railings, farm equipment, machinery, lawn mowers, toys. Does 1001 jobs on iron, steel, bronze, brass, aluminum, etc. Operates on any properly wired 110 AC or DC line.

**SEND ONLY \$3** Pay postman \$11.75 plus C.O.D. charges. Simple instructions included. Ideal lifetime gift for hobbyist, mechanic, hot rodder, homeowner. Order direct on 10-day money back guarantee or write for literature **FREE**.

**FOUR WAY WELDER CO., Dept. F3-B**

1810 S. Federal St.

Chicago 16, Ill.

Sent complete with twin carbon arc torch, welder's shield, carbon, welding and brazing rods. Ready to use.

# HOW A FEW LOW-COST PARTS CAN GIVE YOUR CAR THOUSANDS OF EXTRA MILES!

Which parts to replace is as important as when to replace

Nobody wants to put out good money for an engine overhaul if there's no real need for one. But when key parts such as bearings are too far gone, your car engine can no longer operate efficiently.



## WHEN TO GET AN OVERHAUL

Know the signs, and you'll know the time. You'll probably notice that your engine has lost much of its original pep. Gas mileage drops off, oil consumption begins to get out of hand . . . and your engine may knock or misfire. Your car isn't ready to be retired yet. Do as fleet owners do. Treat your engine to a *complete* overhaul. Your car will purr like new again.

## WHICH PARTS NEED REPLACING

Get a first class mechanic, and *don't compromise on parts*. Parts represent the smallest portion of the cost. You'll probably need new main, connecting rod, and camshaft bearings. These bearings control the amount of oil that lubricates vital parts in your motor. And for bearings to give proper oil clearances, they must be manufactured to tolerances as small as .00025".

## FEDERAL-MOGUL MEANS LONG SERVICE

Your car engine is a precision mechanism, and bearings—main, connecting rod and camshaft—are the very heart of it. Yet it costs no more to use the best—Federal-Mogul. Ask any mechanic. *There's a Federal-Mogul engine bearing to fit every domestic and leading imported make of car.*

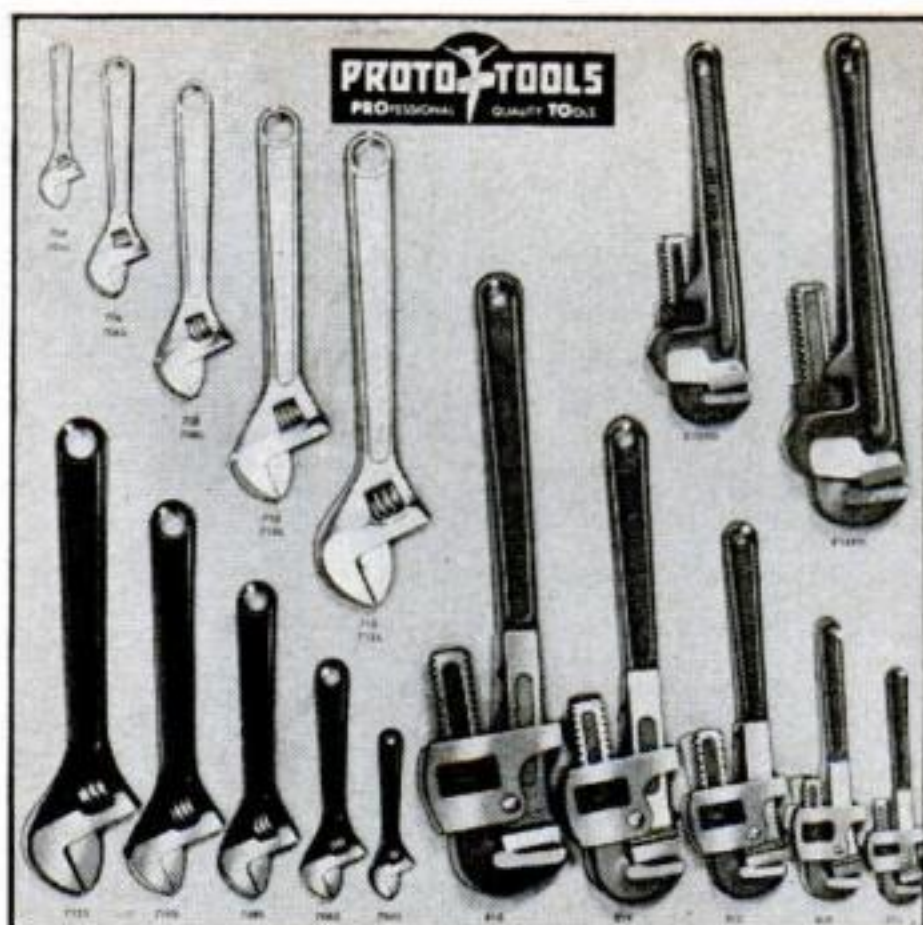


**FEDERAL-MOGUL SERVICE**



Division of Federal-Mogul-Bower Bearings, Inc. • Detroit 13, Michigan





Proto's Adjustable Wrenches, including the famous Klik-Stops®... and Pipe Wrenches, both Stillson pattern and Heavy-Duty... are the finest obtainable. Every Proto Tool is guaranteed.

## PROTO TOOL COMPANY

2203 Santa Fe Ave., Los Angeles 54, California  
503 Allen St., Jamestown, N.Y.  
1703 Oxford East, London, Ontario, Canada



## CLOGGED SEWERS? CLEANED INSTANTLY BY IMPACT SAVES PLUMBING BILLS—TIME—EFFORT

FREE  
★  
BOOK

TELLS HOW TO  
CLEAN ALL DRAINS

Anyone can trigger this new Flushing Gun shooting air & water impact on difficult stoppages in pipe 1/2" to 6"; Rags, Grease, and Roots melt away when struck by hammer-blow in Toilets, Sinks, Urinals, Bathtubs, & House Sewers 200 ft. Amazingly effective when air hits running water. Worth many times the Cost in Plumbing Bills or Start your own Business. Tear out Ad now, write Address beside it for **FREE BOOKLET**, no obligation. No Agent will call; or phone Kildare 5-1702. **MILLER SEWER ROD, DEPT. PS-2, 4642 N. Central Ave., Chicago 30, Ill.**

**Tremendous  
Savings on  
Hundreds of  
Surplus and Newly  
Manufactured  
Items!**

Equipment for farm, home, work-shop, factory. Hydraulic equipment, pumps, motors, construction and diesel equipment and parts, etc. Write for **FREE Catalog today!**

**GROBAN SUPPLY CO.**

1139 S. Wabash Ave., Dept. PS2, Chicago 5, Ill. WE 9-3793

## ELECTRIC WELD - BRAZE & CUT

### REPAIR MOST EVERYTHING MADE OF METAL

Home Appliances, Auto parts, Farm-garden equipment, toys. Make and repair playground equipment,



lawn chairs, tables, ornamental iron work, gates, wagons, etc. Solder, heat, bend, and straighten, with terrific heat from arc torch. Cut and weld up to 1/4" steel plate. A million uses for Home, auto, farm, inventors, factories, etc. Works from any home 110

volt plug-in. Complete with dark welder's mask, arc torch, supply of carbon welding and brazing rods and complete Welding Instruction Book. Efficient—durable—1 year guarantee. Wt. only 4 lbs.

**SEND ONLY \$1.00** (cash, ck, mo) and pay postman \$9.95 plus COD postage on arrival or send \$12.95 and we will send postpaid. Ideal gift for mechanically minded home owners, relatives, friends. Order now for early delivery. Available only from:

**MIDWAY WELDER Dept. DPS-2 Kearney, Nebraska**

## Knee-Spring Struts for Model Planes

[Continued from page 141]

three spring loops, as shown. The strut is simply a piece of hard-drawn brass tubing with another piece of the next smaller size telescoped inside it, the two being connected by the knee spring.

The ends of the spring are bound to the tubing with close-wrapped, fine copper wire, then soldered. The difficulties usually experienced in soldering music wire can be eliminated by sanding the wire to a rough, bright finish and by the sparing but thorough use of noncorroding solder paste.

No definite tubing diameters are given because the size used will depend on the plane. Best rule is to use the largest diameter that suits the scale of the model for the fixed part of the strut. For the sliding part, use the next smaller diameter. Make the telescoping engagement as long as possible.

Wire sizes for the springs can range from about .02" to .04" depending on the desired stiffness. The knee spring alone is quite effective in maintaining front-to-back alignment of the two tubes, in most cases entirely preventing caster shimmy, provided the length of the spring legs is roughly equal to half the diameter of the landing wheel.

The upper ends of the struts can be cemented into solid balsa where there is sufficient thickness for a strong mount. If not, they can be wired and cemented to plywood bulkheads mounted in the fuselage or engine nacelles. In most cases, additional stiff-leg wire braces are run diagonally to the struts for extra strength.

One of the most useful designs is called the "terminal-compression strut" because the spring is fastened to the terminal point, or lower end, of the strut. This makes it easy to solder the wheel axle directly to the lower tube. It also has a happy resemblance to the trailing shock-absorber arms found on full-scale planes.

The telescoping tubes must be kept working smoothly. For lubrication, use a semi-liquid mixture of light oil and powdered graphite squirted into a small hole in the outer tube.

Properly made, the knee-spring strut will withstand an incredible amount of punishment and will well repay your time in many hours of safe, happy landings.



# EMERSON ELECTRIC

## NEW POWER For Your Tools...

There's an Emerson Electric Motor for every tool... sanders, saws, joiners, pumps, lathes, drills, buffers, etc... Home workshop or commercial. Operate in any position... exclusive dust-proof contact points. One year guarantee.



Write today for prices and FREE MOTOR SELECTOR GUIDE... tells you the exact motors you need for your tools.

EMERSON ELECTRIC of St. Louis  
8100 Florissant • St. Louis 36, Mo.



## HI-FI SOUND EFFECTS

Newest sounds — airplanes — DC8 — Electra prop-jet — Boeing 707 — Air Force F-104 Starfighter — Regulus I — missile launching — carrier sounds — also autos — music — trains — household — industry. More than 12 classifications; over 1500 real-life sound effects. See your dealer or send 25c for 32-page catalog. BOX H  
MP-TV SERVICES, 7000 Santa Monica Blvd., Hollywood, Calif.

## OUTBOARDERS

FOR THE BEST

SKIING... RACING... CRUISING... TROLLING

"MULTI-PITCH" Variable Pitch OUTBOARD PROPS

OVER 10,000 IN USE • Simple, Rugged, Guaranteed  
For most 25-45 hp motors • Ask your dealer, or write

LESNOR-MAHR MARINE CO., INC. • Floral Park, L.I., N.Y.

7  
PROPS  
IN ONE  
from  
\$27.75

## JEEP OWNERS

Re-Power NOW with a V-8 or 6 Cyl engine—Use

Ford • Chev • Mercury • GMC • Pont • Stude • Dodge or Plymouth in Jeeps, Jeepsters, Sta-Wgn, Trucks, Kaiser & M. J. cars. Conversion kits \$45.35 to \$56.90. Want fast action? Give us full information, send \$15.00 Dep. and we will ship correct kit. Bal. COD. Send full amount for prepaid shipment. Wire, phone or write today. Details FREE.

HOOSIER MACHINE PRODUCTS CO.

314 S.E. 6th St.

Phone CR6-3442

Pendleton, Oregon



## FIRST CHOICE

For three generations Gerstner Chests have protected the precision tools of America. Free catalog to toolmakers and machinists.

GERSTNER TOOL CHESTS  
560 Columbia St. Dayton 7, Ohio

## TOOLS and HARDWARE WHOLESALE!

Start Your Own Business

Sell nationally advertised tools to your friends and neighbors. Also for your own industrial and institutional use. New giant wholesale catalog has room for only your name on it. You get all the orders and reorders. A MILLION DOLLAR INVENTORY AT YOUR FINGERTIPS. NO STOCK TO CARRY. ORDER AS YOU NEED IT! Stanley, Clemson, Diston, K & E, Lufkin, Miller Falls, Thor, Wiss and many other name brand tools, appliances, motors, electric tools, hand tools and others too numerous to mention. WHOLESALE DISCOUNTS UP TO 50% OFF. WE SHIP COAST TO COAST... Send \$1 deposit and get the new giant illustrated wholesale catalog. Your \$1 is credited to your first purchase or refunded if not 100% satisfied. Write NOW!

U. S. SUPPLY CORP., Dept. 285

149 Church St., N. Y. 7, N. Y.

HUGE PROFITS!  
MORE MONEY!

Get up to  
50%  
off

Till close to hedges,  
under shrubs!

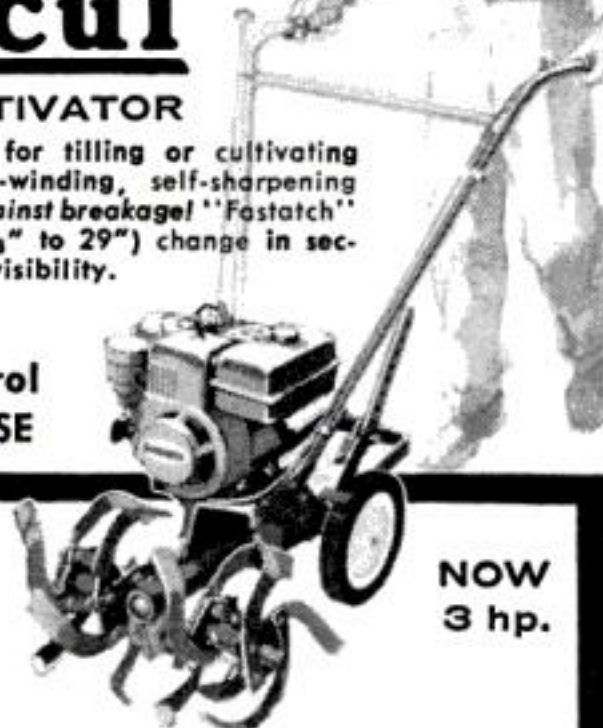
**Simplicity**

## Rotical

TILLER-CULTIVATOR

Plenty of capacity for tilling or cultivating heavy soils. Non-winding, self-sharpening tines, guaranteed against breakage! "Fastatch" tine assemblies (8 3/8" to 29") change in seconds. Full working visibility.

First with  
finger-tip control  
POWER REVERSE



Write  
for  
FREE  
catalog

NOW  
3 hp.

**SIMPLICITY MANUFACTURING COMPANY**

6035 Spring Street, Port Washington, Wisconsin

Makers of Simplicity Garden Tractors, Wonder-Boy Riding Lawn Mowers, and the New Simplicity 700 Riding Tractor.

Rare, Fancy & Imported Woods... Veneers... Plywoods  
Mouldings... Patterns... Hardware... Mosaic Tile  
Ornaments... Tools... Archery and Skiing Supplies

## Everything You Need in Craftsman's New WOOD Workshop CATALOG

Get Yours! Rush Coupon Today!

132 pages



NEW—MOSAIC TILE PROJECTS!

World's Largest Selection of Finest Domestic and Imported Woods... Mouldings, Hardware, Tools—ALL AT LOW MONEY-SAVING PRICES!

Your complete wood buying guide and project book. Craftsman is your best, most complete source of finest kiln-dried domestic and imported woods, beautiful wood inlays, colorful bandings, matched plywoods, embossed mouldings, carved ornaments, newest wood-working tools, "hard-to-find" cabinet hardware; more than 1,500 items! Packed with newest scroll saw patterns, project ideas and money making plans. Enclose 25c (refunded with first order) to help pay mailing and handling cost. Write TODAY to

CRAFTSMAN WOOD SERVICE CO., Dept. B 2, 2729 S. Mary St., Chicago 8

CRAFTSMAN WOOD SERVICE CO., Dept. B-2  
2729 S. Mary Street, Chicago 8, Ill.

Enclosed find 25c. Rush new CRAFTSMAN WOOD CATALOG.

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ ZONE \_\_\_\_\_ STATE \_\_\_\_\_



# ...TURN CONCRETE INTO GOLD!



**MAKE UP TO \$75 A DAY IN YOUR OWN BUSINESS**

If you want to have your own business — to start a business on your own — here's your big opportunity! New high speed, low cost General block machine produces up to 1,000 concrete blocks a day. Sell all you make to builders, supply houses, and others for homes, factories, buildings, garages. Cash in on the building boom! You can make profits of 100% to 150% — up to \$75. a day! General block machine equipped with ½ h.p. electric motor — or can be supplied with gasoline engine — works anywhere, in little space, indoors or out. Operates from ordinary house light socket. Simple, foolproof 3 step operation — so easy a child can do it. Makes superior 3 core blocks any size from 4" to 12". Also makes chimney, sash, corner and other types. Blocks meet any building code anywhere in the country. Materials — sand, water, cement, available anywhere. Simple illustrated operating instructions and mixing formulae for cement and cinder blocks supplied with each machine. Write for FREE folder with full information.

**MOTOR DRIVEN**

R. L. T. of New York City reports: "MY GENERAL BLOCK MACHINE PAID FOR ITSELF IN FIRST 2 WEEKS!" Hundreds now in use the world over! Write for FREE details today!

**EXTRA**

Amazing illustrated book gives floor plans for 6 sensational concrete block bungalows. Tells how to lay blocks, lay out building lines, mix concrete, build steps, porch and concrete floors all of great savings. Written by experts. Can save many times the cost of the machine! Get it now! No strings attached. Send \$1.

BOOK SENT FREE IF YOU BUY MACHINE.  
\$1 REFUNDED IF YOU BUY LATER.



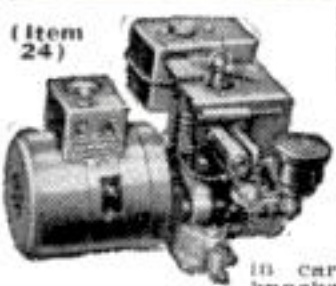
## GENERAL ENGINES CO.

DEPT. S-20

ROUTE 130, THOROFARE, N. J.



**"FIRE UP"**  
YOUR ENGINE AT ALL SPEEDS WITH  
AUTOLITE RESISTOR SPARK PLUGS WITH  
**POWER TIP**  
LOOK FOR THE PROTRUDING TIP!



**700 Watt Light Plant** PUSH BUTTON START  
115 v. 60 cyc. AC Powered by a rugged 2.2 HP. easy starting Briggs engine. No wiring necessary; just plug in and operate. Plenty of current for any oil burner, freezer, brooder, emergency lights, etc. which require up to 700 watts. Ideal for television and radios. Complete with voltmeter and built-in winding to charge 6 v. auto batteries. (Item 24) Wt. 75 lbs. Easily fits in car trunk. Be prepared if storm knocks out power lines. Reg. \$275... **\$143.50**

**1200 Watt Plant** (Item 45) same as Item 24 but larger generator and engine with 50% greater output... **\$199.50**

**ELECTRONIC BRAIN** Now Available On All Our Plants Up To 100,000 Watts! Allows plant to saunter along at a thrifty idle till electricity is called for. Then instantly... automatically, plant comes up to full speed with a steady 115 volts of power. When demand stops, the BRAIN returns plant back to that same thrifty idle. Saves gas, doubles engine life! If BRAIN desired, specify & add 3 lb. and \$35 to plant price.



**HEAVY DUTY D-C ARC WELDER**  
Use as portable or shop welder. Up to 300 amps. Senior model. Made for years of trouble-free, continuous service. Will handle light or heavy jobs. Easily welds up to ¾" plate using ¼" rods. Built-in air cooling system. Arc is easy to strike and hold, because of specially designed arc stabilizer. Hi-lo switch and dial control gives wide range of welding heats. Run welder at 2600 rpm. with tractor, Jeep or 15 hp. gas engine, or 7 hp. elec. motor and triple V belt or flat pulley. You can pay more, but you can't buy a better welder. Wt. 110 lbs. \$400.00 value... **\$119.50**  
**WELDING KIT.** Two 10 ft. leads, welding helmet, electrode holder, ground clamp. Sold only with welder at... **\$10.50**  
Send 10c for 100 page Catalog-FREE with order. Prices f.o.b. factory—Send check or M.O.

**MASTER MECHANIC MFG. CO., Dept. B-26**  
P.O. Bx. 389, Burlington, Wis. — or P.O. Bx. 65, Sarasota, Fla.

## Are U.S. Front-Drive Cars Coming? [Continued from page 99]

almost the same type front-drive unit as the L-29 Cord that served as pace car that year. Fred Frame won with a similar car in 1932. Lou Moore's Blue Crown Specials, all front-drive cars, dominated the early postwar Indianapolis events—winning in 1947, '48, and '49. The powerful Novi cars were originally front-drive machines; they were converted to rear drive just a few years ago.

**And in Europe.** Present stronghold of front-wheel-drive cars is Europe. Such makes as Citroen, Panhard, DKW, Auto Union, and Saab have used nothing but front drive for years.

The Citroen DS-19 and ID-19 models are the most significant of the front-drive foreigners, because of their advanced engineering features and because they are closest in size to U. S. cars. They weigh about 2,500 lb., about the same as Corvairs and Falcons. They are 189 inches long, just two inches shorter than Rambler. They are noted for their excellent riding and handling qualities.

Even such companies as Peugeot of France and Alfa Romeo of Italy, which still build only rear-drive passenger cars, find front-wheel drive attractive for certain applications. Both build light vans, using their regular passenger-car engines, with front drive. The absence of drive components under the body makes for huge cargo space, relative to outside dimensions, and permits very low platform loading heights. (The same would be true for station wagons, which accounts for the front-wheel-drive gleam in the eyes of many Detroit engineers and stylists.)

**Activity in Detroit.** Reports that Ford will switch its whole line to front drive by 1963 have already been published. (But then there have been rumors that the Comet, Ford's second compact car, due this spring, would have front drive—and that's definitely not true.) Three things are sure:

- 1) Ford is spending a lot of time and money investigating front-wheel drive.
- 2) The company's loud talk against rear-engine, rear-drive cars means it can't go that route if it decides to forsake the conventional front-engine, rear-drive arrangement.
- 3) A Ford supplier is tooling up for



## GUNK-it-yourself!

Gunk® G.P. removes grease from engines or concrete floors; cleans paint brushes, power mowers, or machinery completely, economically, safely. It's ready-to-use, rinses off with water, won't clog drains. Quart size with handy "Squirt Spout" top speeds application. Insist on the *best* degreaser — the original "GUNK" at better automotive supply and hardware retailers everywhere.

® REG. TRADE MARK.



**GUNK CHICAGO CO.,** River Forest, Illinois  
serving the Midwest and Southwest  
**RADIATOR SPECIALTY CO.,** Charlotte, No. Carolina  
serving the East, Southeast and far West



### DRAINS cellars, cisterns, wash tubs; IRRIGATES - CIRCULATES - SPRAYS

1,001 uses. Stainless shaft. Won't rust or clog! Uses 1/6 HP motor or larger. 1/4 HP for up to 3000 GPH; 450 GPH 80' high; or 1800 GPH from 25' well. 1" inlet; 3/4" outlet. Coupling included free. **Heavy Duty Ball-Bearing Pump.** Up to 7,500 GPH. 1 1/4" inlet; 1" outlet.

Postpaid if cash with order. Also other sizes, types. **MONEY BACK GUARANTEE.**

**LABAWCO PUMPS, Belle Mead 3, N. J.**

### CELLAR DRAINER 'Low Boy' KIT

15 1/2" high  
1500 GPH

**\$12.95**  
(less motor)

'High Boy'—32" high, 3,000 GPH

**\$15.95** (less motor)

## BUILD YOUR OWN MIDGET ROADSTER \$25 BUILDS BODY & FRAME



IT'S EASY TO BUILD A PONY ROADSTER or Pick-Up in few spare hours. Uses 2 hp engine, 450 lb. loads, 70 m.p. gal., plenty of speed. Great for kids, sturdy utility car. Designed for **VERY LOW-COST** assembly from **PARTS BOUGHT IN YOUR NEIGHBORHOOD.** Use home tools. **COMPLETE** step-by-step plans, 17 large-size pages, 30 "show-how" photos, Body templates, complete material, parts list and hood insignia. **ORDER NOW. ONLY \$2.95** postpaid. Satisfied or money back.

**PONY PLANS, Dept. 42 100 S. VERMONT, LOS ANGELES 4, CALIF.**



## G E A R S

In Stock—Immediate Delivery

Gears, speed reducers, sprockets, thrust bearings, flexible couplings, pulleys, etc. A complete line is carried in our Chicago stock. Can also quote on special gears of any kind. Send us your blueprints and inquiries.

Send for Complete Catalog No. 220

**CHICAGO GEARWORKS**

440-450 N. Oakley Blvd. Chicago 12, Ill.

## FALSE TEETH BREAK?

Good News! Now you can repair **\$1.98** them at home in 10 minutes.

Amazing **PLATE-WELD** repairs clear & pink plates and teeth. Simply flow on-put together. Works every time. Plenty for many repairs—full instructions—money back guarantee. Free cleaner & polish if ordered now. Order sent day received. Send \$1.98 no C.O.D. to

**HOME DENTAL AIDS**

Box 1731 Dept. 17-T Bakersfield, Calif.

## FREE!



## BOY SCOUTS STAMP

To honor the Golden Anniversary of Scouting in America the U.S. will issue a new bi-colored commemorative on Feb. 8th. We will send you a beautifully engraved souvenir envelope carrying this stamp, mailed at Washington on its first day of issue **plus** the only stamp ever issued with President Eisenhower's portrait AND a Grace Kelly Wedding stamp—all for only 25c. Or order 8 all different First Day Covers for only \$2. Send one to every Boy Scout you know—he'll be thrilled with it. Money back if not completely satisfied—ask for lists of other covers.

**K. M. WALSH Box 308-B TUCKAHOE, N. Y.**

America's Biggest Garden Tractor Value



### MORE POWER FOR BIG JOBS

Better Traction  
on All Surfaces

### 3 Great Models:

7 hp.  
5 3/4 hp.  
3 hp.



### SIMPLICITY MANUFACTURING CO.

6035 Spring Street  
Port Washington, Wis.

Makers of Simplicity Wonder-Boy Riding Lawn Mowers, Raticul "Full Power Reverse" Tiller-Cultivator and the New Simplicity 700 Riding Tractor.

Year 'round labor saving for mowing — plowing — tilling — hauling — snow removal. Auxiliary power for a host of jobs. New Controlled Traction differential improves traction for all different soil conditions, for ice and snow. And all control is at your finger tips! Write for **FREE** catalog.

Another outstanding value from University...  
world's leading quality speaker manufacturer

## Did you know that an authentic high fidelity speaker system...



costs  
only **\$56.95**

**MODEL S-80 Components:** 8" woofer, cone tweeter. 21 1/4" x 11 1/2" x 9 1/4" deep. Unfinished rock maple—\$56.95; mahogany, walnut or fruitwood—\$59.95.

If you've been waiting for a true high fidelity speaker system that requires only the barest minimum of space and fits the smallest budget...here it is! University's new Model S-80 is a complete two-speaker system whose performance will please the most discriminating music lover. Its small size and neat styling let you place it anywhere...on bookshelf, bench, or built-in...either by itself for monophonic reproduction, or as a matched pair for superb stereo. See and hear it at your University dealer...and be convinced the S-80 is the finest value on the market today. For details on the S-80 and other fine University products, write for

**Informative Guide to High Fidelity**  
Desk B-5, University Loudspeakers, Inc., White Plains, N. Y. A subsidiary of Ling-Altec Electronics, Inc.





# HOME appliances

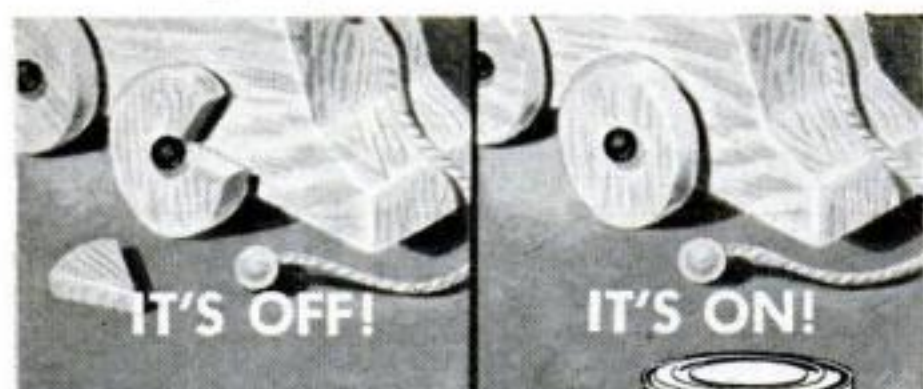


run so **SWEET**  
last longer too

WHEN OILED REGULARLY WITH  
**3-IN-ONE OIL**

Always use REGULAR or OIL SPRAY for general jobs:  
ELECTRIC MOTOR OIL for heavy duty. BUY ALL THREE!

## TOYS BROKEN?



Fix 'em quick with the one and only Plastic Wood. It can be sanded, planed, painted!



For surest results always use GENUINE

# PLASTIC WOOD

Handles like putty—hardens into wood!

## NEW

### HYDROFOILS KIT

Put hydrofoil Sea Wings on your outboard hull. Get as much as 25% more speed, get exciting above the water performance, get smooth, precision turns with no skidding. For the first time you can get hydrofoil Sea Wings in a simple do-it-yourself kit for 14 to 16 foot outboard hulls.



- Get all the facts now. Write for free illustrated folder to Dynamic Developments, Inc.  
Babylon, New York, an affiliate of  
Grumman Aircraft Engineering Corporation

**Are U.S. Front-Drive Cars Coming?**  
high production of the constant-velocity U joints that would be needed.

General Motors and Chrysler show few outward signs of current interest in front-wheel drive—though both have experimented with it in the past.

GM's LaSalle dream cars of a few years back were originally designed with front drive, though they reverted to more conventional design before being shown publicly. Another GM Motorama dream vehicle, L'Universelle, a light truck, also had front-wheel drive.

American Motors officials look blank when front-wheel drive is mentioned, but it would be a natural for the little Metropolitan line.

**Watch the Corvair.** One factor that likely will influence the future of front-wheel drive in this country is long-term public reaction to Chevy's Corvair. If it sells well, this will be taken as an indication that U. S. car buyers are ready to accept drastic engineering changes.

If this happens and U. S. front-drive cars are in the offing, how would they be built?

They would have a differential set squarely between independently sprung front wheels. Half-axes would be connected to the wheels by constant-velocity U joints.

Back of the differential would be a lightweight engine, probably of aluminum. Ahead of the differential would be the transmission. (Kaiser tried putting both engine and transmission ahead of the front wheel centers when it experimented with front drive right after the war. Didn't work. There was too much weight forward, and all kinds of handling, steering, and braking problems resulted.)

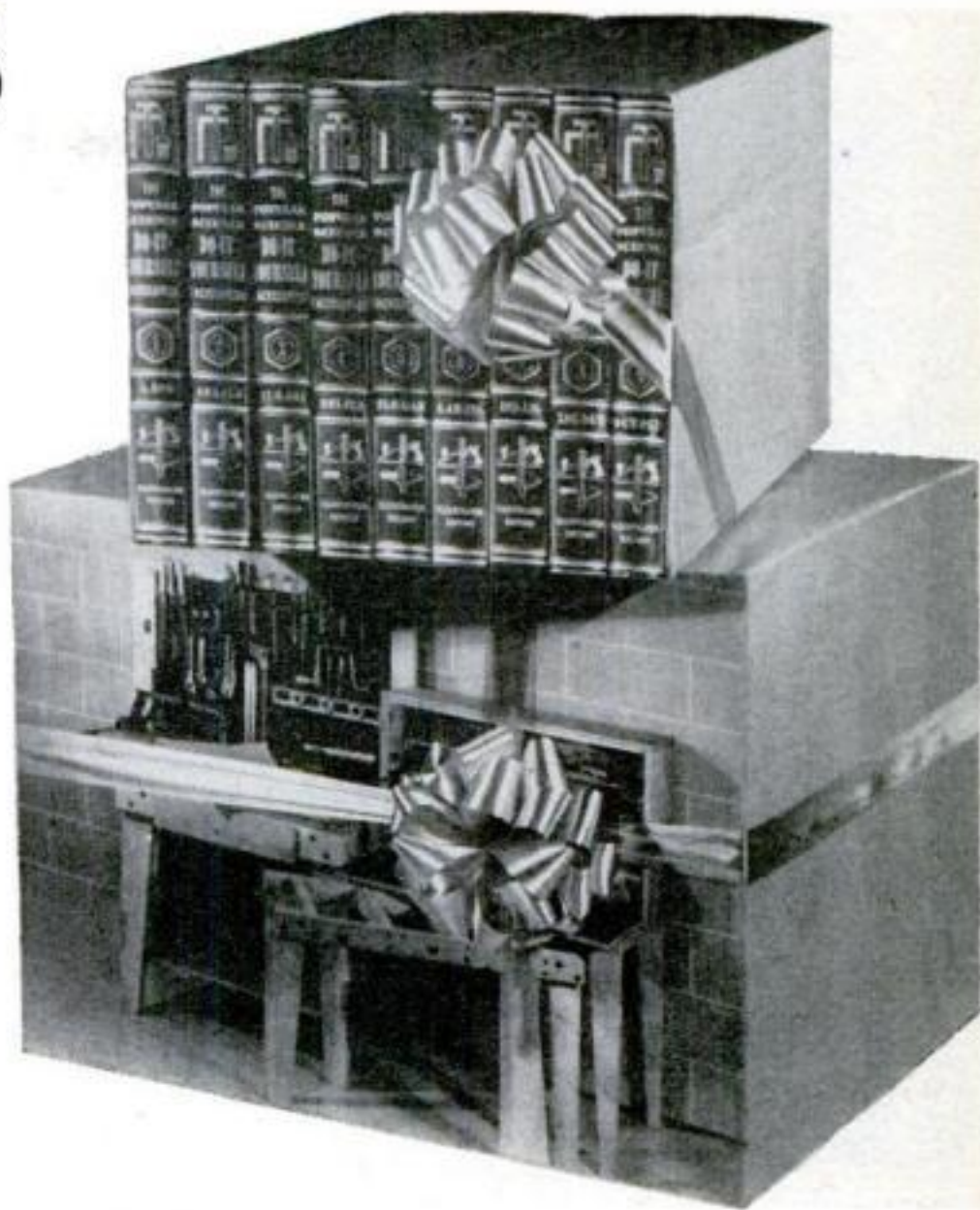
Such a car would be lighter than today's standard-size cars. It would have a unitized body with a stub frame bolted on at front to carry the body-drive package—of the kind Chrysler uses now and Cord had 20-odd years ago.

Rear wheels would be sprung independently, improving riding comfort substantially.

The car would be low, yet have ample head room and ground clearance. It would have upwards of 60 percent of its weight, unloaded, on the front wheels. It would handle much like cars we're driving right now.



# ANNOUNCING THE WINNERS OF THE POPULAR SCIENCE SPLIT-LEVEL WORKBENCH CONTEST



## WORKBENCH AND ENCYCLOPEDIA WINNERS

Stuart M. Shotwell, Weston, Massachusetts  
Commander Thomas E. Keyes, U. S. Navy  
Colorado Springs, Colorado  
L. W. Janes, San Pedro, California  
John P. Espy, Abbeville, Alabama  
Israel Kaplan, Potsdam, New York  
Michael B. Lockhart, Ambler, Pennsylvania  
Alfred F. Silva, East Boston, Massachusetts  
Jerome Schopp, Chenoa, Illinois  
Eric Stigler, Chicago, Illinois  
Donald Lawrence White, Mendham, New Jersey  
Mrs. Martha Horn, Ft. Worth, Texas  
A. Raddatz, Chicago, Illinois  
Joseph Sinder, Westchester, Illinois  
Victor M. Wolak, Everson, Pennsylvania  
J. P. Youngblood, Gardner, Kansas  
Robert Merkle, Claypool, Indiana  
Frederick O. Krueger, Seattle, Washington  
Raymond Stover, Niles, Michigan  
Paul Rosen, Berkeley, California  
Gordon H. Biggins, Jacksonville, Florida  
Harold Smith, Huntington, New York  
S. C. Johnson, Minneapolis, Minnesota  
W. T. Shaddock, Camden, Arkansas  
R. W. Wight, Tucson, Arizona  
Myron Stallsmith, Athens, Ohio

## POPULAR SCIENCE SUBSCRIPTION WINNERS

William G. Waggoner, Sacramento, California  
Leland Bond, Cedar Falls, Iowa  
Clarence Prendergast, Kalamazoo, Michigan  
Kenneth Ramsey, Dayton, Tennessee  
Roger C. Meyer, Roy, Utah  
Douglas N. Hubbard, Atlanta, Georgia  
Melvin Look, El Cerrito, California  
John J. Blainey, Seattle, Washington  
Dr. Louis L. Leff, Brooklyn, New York  
Abe M. Levin, New York, New York  
C. W. Cherry, Jr., Columbia, South Carolina

Raymond Clason, Oklahoma City, Oklahoma  
R. Irving, Los Angeles, California  
Ernest J. Bammann, Washburn, Illinois  
Clarence E. Davis, Tucson, Arizona  
Milton R. Yirak, Omaha, Nebraska  
William G. Tonet, Tarentum, Pennsylvania  
Ronald Trostel, Woodbury, New Jersey  
Hal Austin Stein, New York, New York  
Carl Stark, Empire, Oregon  
John J. Bold, Strongsville, Ohio  
Paul A. Johnson, Iowa City, Iowa  
Ivan Herring, Freeland, Michigan  
Thomas R. Groff, Ann Arbor, Michigan  
Harold M. Brammal, Warwick, Rhode Island  
Earl G. Atkinson, Mead, Washington  
Robert B. Richardson, Plymouth, Michigan  
David Keller, North Augusta, South Carolina  
John Moon, Carbondale, Pennsylvania  
Walter John Wasko, Detroit, Michigan  
Cloice W. Brooks, Culver, Indiana  
Edward M. Deering, Seattle, Washington  
Ralph S. Paganucci, Pittsburgh, Pennsylvania  
Leroy W. Collins, Kansas City, Missouri  
Robert J. Davis, Coulee Dam, Washington  
John M. Hamilton, Tucson, Arizona  
Robert F. Petrusek, Mena, Arkansas  
Emil M. Jecmen, Jr., St. Louis, Missouri  
George J. Dyhrberg, Omaha, Nebraska  
Roy E. Hardman, Jr., Columbus, Georgia  
Ellsworth H. Greasby-Ranger, Westville, Ind.  
Lloyd Moberquette, Revere, Massachusetts  
Juan G. Rodriguez, San Antonio, Texas  
R. J. LaMiller, Tracy, California  
Anthony V. Marco, Jr., Berea, Ohio  
Russell H. Anderson, Torrington, Connecticut  
Israel M. Wise, Columbus, Ohio  
Glen B. Cameron, East Cleveland, Ohio  
Robert E. Casey, Escanaba, Michigan  
R. D. Bagwell, Atlanta, Georgia

## BUILT-IN BOOK WINNERS

Ronald J. Gillespie, Toronto, Ontario, Canada  
Francis Bonnett, Weston, West Virginia  
John R. Merrbaugh, Lonaconing, Maryland

Theodore S. Shilliday, Columbus, Ohio  
V. O. Cunningham, Chattanooga, Tennessee  
Morton Alpert, Indianapolis, Indiana  
J. A. Logue, Dublin, Ireland  
Bert J. Leeman, Enschede, Holland  
H. G. O'Kelly, Vancouver B. C., Canada  
Toshio Yoshida, Honolulu, Hawaii  
Robert N. Vogel, Kansas City, Missouri  
Paul Grimes, Cedertown, Georgia  
Walter E. Dienelt, Washington, D. C.  
Daniel M. Locke, Salt Lake City, Utah  
John J. Boyle, Santa Cruz, California  
Mrs. Frank Lee, Salt Lake City, Utah  
Oliver P. Dragon, Easthampton, Massachusetts  
Samuel G. Myford, McKeesport, Pennsylvania  
Durward W. Balduf, Batavia, New York  
Clarence C. West, Coral Gables, Florida  
George P. Pearce, Albuquerque, New Mexico  
William F. Britt, Fort Worth, Texas  
S. J. Haefner, Waterford, Connecticut  
R. L. Scroggs, Stone Mountain, Georgia  
W. L. Tucker, Sacramento, California  
Garth Bedford, Ontario, Canada  
Buell R. Snyder, Beachwood, New Jersey  
C. E. Frady, Rocky Mount, North Carolina  
Ah Chai Chingon, Honolulu, Hawaii  
Henry P. Stover, Hershey, Pennsylvania  
Harold Densmore, Fort Wayne, Indiana  
R. H. Muehlberg, Juneau, Alaska  
David B. Kunstler, Burlingame, California  
James F. Woolvin, Hampton, Virginia  
William G. Sutcliffe, Camden, Maine  
Donald L. Shirer, Valparaiso, Indiana  
Cpt. Willis D. Vey, USMC, Jacksonville, N. C.  
Melvin J. Louviere, Irving, Texas  
G. V. Morris, Climax, Canada  
Truman A. Day, Lisbon Falls, Maine  
Julius Farkas, Barrackville, West Virginia  
R. K. Bossong, Coral Gables, Florida  
Clifford L. Carlson, Kensington, Connecticut  
Kermit L. Johnson, Hoyt Lakes, Minnesota  
James E. Scarborough, Jr., Quantico, Maryland  
Walter Pharis, Johnson City, Tennessee  
James M. Jay, Lake Charles, Louisiana  
John Mihalick, East Liverpool, Ohio  
Lyle E. Harmon, Topeka, Kansas  
Donald W. Wirth, Logansport, Indiana



FURNITURE

CABINETS

WOOD PANELLING

**NOW!**

LUXURIOUS HAND-RUBBED

**NATURAL WOOD FINISH**

WITHOUT THE RUBBING

**WOOD LORE**

Needs no primer; applies so easy anyone can use it with excellent results.

Use over any wood interior —new or old — natural or painted — for luxurious "hand-rubbed" effect.

At paint, hardware and lumber dealers coast-to-coast

**P&S** **PIERCE & STEVENS CHEMICAL CORP.**  
710 OHIO STREET, BUFFALO 3, N. Y.  
Makers of **FABULON** the fabulous floor finish

## Electric Tractor Makes Its Own Juice

[Continued from page 71]

Grove built one in 1839. Ludwig Mond and Carl Langer had another crack at it in 1889. Their troubles—mainly with the reaction-hastening catalyst, which "poisoned" quickly and killed the battery—scared others away.

**Military demand changed things.** During and after World War II, barrels of gold waited for anybody who could invent a power generator as potent as a diesel but as portable as a battery. If it turned out to be cheap, too, you and I and everybody else would become sales prospects.

In England, Francis T. Bacon (yes, a descendant of the great Francis Bacon) dogged this goal. His Hydrox unit, which combines hydrogen and oxygen with the help of a nickel catalyst, produces 150 watts per pound of weight (a lead auto battery turns out 10 watts per pound). A sample lot of Hydrox units will be delivered to the U. S. Air Force (for auxiliary power in airplanes) this year by Patterson-Moos Research, the American patent holders.

In this country, National Carbon (Eveready batteries) put its research lab onto fuel cells in the Thirties, came up two years ago with a unit that uses electrodes made of porous carbon tubes. It also consumes hydrogen and oxygen but has been run on city cooking gas and air. One hefty battery spent a year on loan with the Signal Corps, powering a portable radar outfit at demonstrations.

**The big breakthrough,** however, came from a Johnny-come-lately to the fuel-cell gambol, Allis-Chalmers, Milwaukee's big old maker of farm and electrical gear. Last year a 20-man team was set to making a cell-powered tractor out of a standard D-12 machine. The result was so successful that it mystifies others in the business.

Allis-Chalmers has somehow managed to make electricity from a cheap fuel—propane mixed with a little hydrogen—at ordinary temperature and pressure. None of the others can do that. They must either run on pure hydrogen, which is costly, or operate at very high temperature, which is also expensive.

A-C engineers are chary of details. They won't identify the electrode, the catalyst, or the electrolyte fluid that

**AUTOMATIC CONTROL OF YOUR GARAGE DOOR**

**ASSEMBLE IT YOURSELF**

**SAVE UP TO 70%**

**✓ ONE AND TWO CAR GARAGES**  
**✓ EASY INSTALLATION IN FEW HOURS**

One of America's oldest and largest door operator manufacturer's can now make this amazing offer to you! Assemble and install this quality garage door operator yourself. If you were able to buy each part individually, you would pay much more than the entire cost of this kit! This is the famous Edwards model KR-50 automatic door operator. WORKS LIKE MAGIC... simply press button and garage door opens and closes automatically. NO MORE COLDS, ILLNESS from getting out of car in snow or rain...costs just pennies a month to operate. Locks door when closed... contains automatic light and quick disconnect device. Easily operated manually in case of power failure. Complete with easy step by step assembly and installation instructions. Ready-to-use radio remote controls optional. COMPARE this fabulous offer! FULLY GUARANTEED.

FREE literature on request

**ONLY \$6495**  
(Normally \$200 installed)  
F.O.B. Yonkers, N. Y.

with remote controls **\$11445**  
(regular \$250 value)

Send Check or Money Order

**MAIL COUPON TODAY!**

**EDWARD T. FINK CO., Inc.** Dept. P  
264 Hopperman Ave., Yonkers, N. Y.

☐ RUSH KIT (\$64.95 enclosed)

☐ RUSH KIT with RADIO REMOTE CONTROLS (\$114.45 enclosed)

☐ Send FREE literature

Name \_\_\_\_\_

Street \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_



# WAR SURPLUS AND OTHER **SAVE UP TO 90%**

**DC JET GENERATOR ARC WELDING KIT** Complete with GE Type CM-77 Generator (30 volts D.C., 400 Amp., 3000 RPM up; ampere rating is for continuous duty, intermittent amperage is 500 to 600 amps.), also 2 rheostats, 1 voltage regulator, 1 voltmeter, 1 electrode holder, 2 ea. 25 ft. lengths No. 0 welding cable, 1 welder's mask, 1 toggle switch, 10 lb. vacuum packed 1/2 in. welding rods, pair welder's gloves & spline coupling. All units guaranteed pre-tested. Wt. 110 lbs. Approx. GOVT. COST \$700. All items, now only **\$64.50**.

\*G.E. Generator noted above can be purchased separately. Makes deluxe heavy-duty welder comparable to the finest commercial welders available. Wt. 90 lbs. Approximate GOVT. COST \$600. Gen. alone—**\$49.50**.



## BUILD YOUR OWN ARC WELDER, LIGHT PLANT OR BATTERY CHARGER \$37.50

Kit incl. 1 Navy NEA-5 Gen. combination AC-DC type. AC 115 V. DC 24 V., 200-300 Amps. 2 complete generators in 1, yet no larger than reg. gen. ideal for home, shop and farm lighting plants. Delivers 1200 Watts AC, DC side for charging batteries, welding and operating war surplus motors. Also in kit: 2 Voltage Regs., AC & DC, Reverse Current Relay, 30' New Welding Cable, 1 Ammeter, Rheostat, Electrode Holder, Toggle Switch, Welder's Shield, Wiring Diagram for kit. Wt. under 100 lbs. Approx. GOVT. COST \$850. Kit—**\$37.50**. Navy NEA-5 Gen. as above, purchased separately, **\$23.50**.

**DOUBLE-V SPLINE 3" PULLEY** For P-1, R-1, GE Gen. shown above. Heavy-duty machine-broached steel. Heavily constructed, will handle any job. Set screw locked. Shpg. Wt. 3 lbs. NEW. **\$5.95**.

**SOUTH WIND HEATER & ACCESSORIES** Mfg. for govt. antarctic expeditions for jeeps and half-tracks. Heating unit puts out over 20,000 B.T.U.'s. Burns any type gas. 6 volt system. Dim: 8 1/4" W x 18 1/2" L x 9 3/4" H. Fuel consumption extremely low, 1 gal. per 8 hrs. Terrific for trucks, boats, tractors... farms, warehouses, ranches, boat houses, cabins, etc. Complete with service & installation manuals and over 360 components. Approx. GOVT. COST \$550. Shpg. wt. 120 lbs. gross. NEW **\$39.95**.



**HOMELITE PORTABLE POWER PLANT** Ideal for battery charging, emergency lights for cabins, camps, aircraft, trailers or wherever power needed. Easy rope pull starting. Fully equipped, ready to start. 2000 W., 32 Volt D.C., 4 H.P. Like NEW. Tested. Shock-mounted. Deluxe type. Net wt. 115 lbs. Gross wt. eased 200 lbs. Approx. GOVT. COST \$700. Now—**\$65.00**. 2500 W.—**\$75.00**.

## BENDIX GEROTOR PUMP & MOTOR—NEW!

Use wherever fluid pumping required. Excellent for hydraulic installations. Has 3/4" pipe connections, built-in relief valve adjustable up to 1500 lbs. Max. cap. 6 GPM. 1 1/2 H.P., 24 V. motor. Use on 12 to 36 V. Approx. GOVT. COST \$350. **\$8.75**.



## ELECTRIC PUMP WITH CONTROL UNIT

Runs on 12 or 24 V. Centrifugal type. Draws 5.2 AMPS. Has built-in removable filtering screen. Great for bilge, circulating or sump pump... bait tanks, etc. Pumps 500 GPH. Complete with on and off switch rheostat, explosion-proof motor, 2 speeds (hi & lo). Mfd. by Ingersoll-Rand. Shpg. Wt. 7 lbs. Approx. GOVT. COST \$195. NEW—**\$8.95**.



**SENSITIVE ALTIMETER** in 20 ft. increments. 0 to 35,000 ft. (inches of Mercury). Famous Pioneer. Tested & inspected in our own instrument lab. Guaranteed perfect. Approx. GOVT. COST \$150. Wt. 2 lbs. **\$13.95**



## ELECTRIC STORAGE BATTERY WINCH

Powerful reduction gear, fully reversible, ball bearing, safety locking device. Will handle from a 1000 to more than 2000 lbs. pull. Use on 6, 8, 12, 24, 32 V. battery. Holds 50' of 1/4" cable. For tractors, boats, tow trucks, etc. Complete with mounting bracket for mounting in any position. Approx. GOVT. COST \$400. NEW. **\$46.50**.

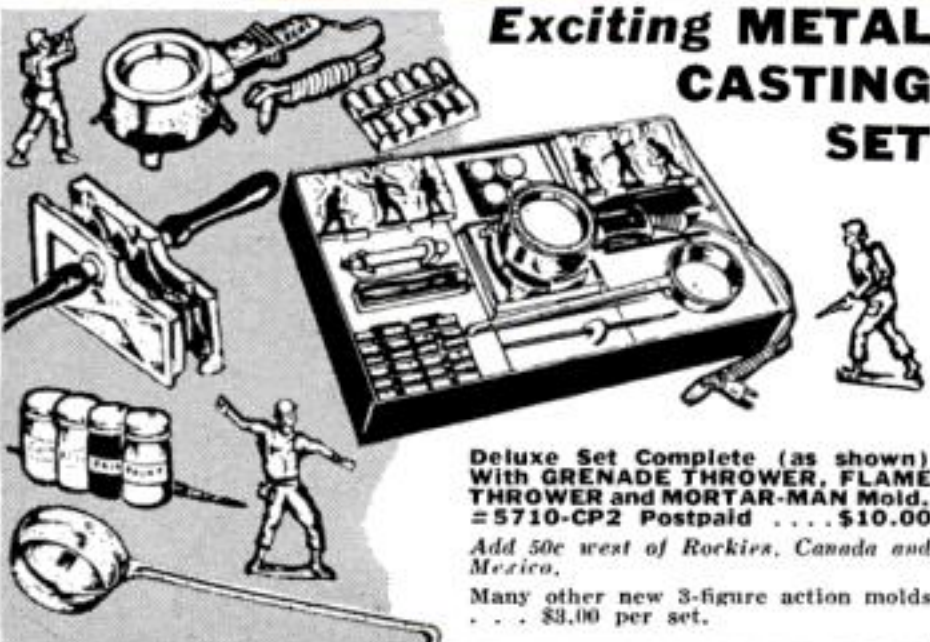
## NEW 1960 CATALOG!

Tremendous catalog—our biggest ever—fully illustrated—1000s of bargains in war surplus & other items. Send 25c in coin for your copy today or free copy with order. Where ppd. indicated applies to US only. Other prices FOB Culver City, Cal. Send cash, check, money order. 50% dep. COD.



**AIRBORNE SALES CO., INC. DEPT. PS 260**  
8501 Stellar Drive, Culver City, Calif.

## Exciting METAL CASTING SET



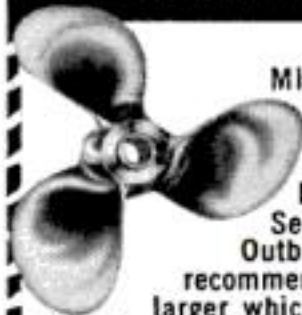
Deluxe Set Complete (as shown) With GRENADE THROWER, FLAME THROWER and MORTAR-MAN Mold. #5710-CP2 Postpaid... **\$10.00**

Add 50c west of Rockies, Canada and Mexico.

Many other new 3-figure action molds... \$3.00 per set.

Home Foundry Mfg., 1826 S. Washtenaw Ave., Chicago 8, Ill.

## UNBREAKABLE PROPELLERS



MICHIGAN'S new NI-BRAL props, for large motors, may be nicked but virtually never bent or broken... carry 5 year guarantee against breakage... eliminate repair lay-ups.

Send card for FREE 1960 catalog—the Outboarder's Bible—giving propeller recommendations for motors of 5 HP and larger which by actual test provide far MORE SPEED, BETTER SKIING or LOAD CARRYING than original prop... other helpful data. MICHIGAN WHEEL CO., Grand Rapids 2, Mich., Dept. PS.

## PEEL PAINT OFF



Furniture



Floors



Boats



Woodwork



## KLEAN-STRIP PAINT REMOVER

Fast • Clean • Non-inflammable

THE KLEAN-STRIP CO., INC.

2340 S. Lauderdale, Memphis 6, Tenn.

## TOOLS WHOLESALE

**\$100 PUTS YOU IN BUSINESS**

Start your own business, sell tools to your friends and neighbors, or buy tools for your own use and **SAVE MONEY \$\$\$**

A MILLION DOLLAR INVENTORY AT YOUR FINGERTIPS. NO STOCK TO CARRY. ORDER AS YOU NEED IT.

**BUY AT WHOLESALE PRICES.** Extra \$25.00 profit on your accumulated purchases. \$1.00 refund on first purchase or refunded if you are not 100% satisfied.

**THOUSANDS!!** of Nationally Advertised items of Hand Tools, Power Tools, Machinist Tools, Tool Chests, Paint Sprayers, Light Fixtures, Appliances, Guns, Gifts, Toys and other items too numerous to mention.

**WE SHIP COAST TO COAST** Wholesale Discounts up to 50% OFF

**SILVO HARDWARE CO., Dept. PS-2, 107 Walnut St., Phila. 6, Pa.**

## LICKITY LOG SPLITTER



**Ends Wood Splitting Drudgery**

Hydraulic power splits profits from waste wood • 7 HP trailer model • two speed • auto shift • auto stroke. Power "squats" to receive large diameter logs without "dead" lift—eighteen ton smooth hydraulic force cuts right through knots, 26" stroke handles up to 30" length, any diameter. Your name on a postal card will bring literature.

**THE WACO AIRCRAFT CO., Dept. K, Troy, Ohio**

Dealer Inquiries Invited



**NOW...for tough tilling jobs**

**choose the all-new—**



**4 h.p. Rotary Tiller**

**EXTRA POWER,  
STRENGTH AND  
SERVICE!**

**New! Ruggedly engineered for tough tilling jobs . . . unequalled dependability. 4 h.p. Kohler; 24" tilling. Tine extenders available to till up to 40". Optional reverse tine drive. Built for Just Easy Tilling!**

**Ariens**

**SOLD & SERVICED  
BY SELECTED  
INDEPENDENT DEALERS**

**Mail to: ARIENS COMPANY**

**159 Calumet St., Brillion, Wisconsin**

**Send free SUPER JET literature.**

**Name** \_\_\_\_\_

**Address** \_\_\_\_\_

**City, Zone, State** \_\_\_\_\_

**New FORMICA<sup>®</sup>**  
Laminated Plastic

**sink top?**

**EASY!**



Build it like a "pro" with Formica Safe-Bond, the new non-toxic, non-flammable adhesive that "tells" you when to contact. And surprise "the missus" with Formica laminates in the smart new Raymond Loewy designs. Get Formica Safe-Bond and sheet stock at your local lumber dealer.

**Formica Corp., Cincinnati**  
a product of



**CYANAMID**

### **Electric Tractor Makes Its Own Juice**

transports the current inside the cells. They claim that all are simple materials, easy and cheap to mass-produce. And they are now readying a fuel-cell version of a commercial fork-lift truck.

*The big promise* of fuel cells is for transportation. Any machine-wise 12-year-old boy knows that the internal-combustion engine is all wrong for vehicles. Besides being complex, noisy, and trouble-prone, it won't run backwards or adjust its power output to the job—you need an extra machine, the transmission, for that. The old-fashioned DC motor—the kind used in trolleys—is just right. It's simple, sturdy, quiet, easy to control or reverse. Most important, it automatically adjusts torque to the work at hand, totally eliminating the need for a gearbox. What killed it was the lack of a good way to supply it with electricity.

Now comes the fuel cell to reverse the situation. You can look forward to an electric car, cheaper and pleasanter to run than anything you have now. It will have individual motors at each wheel, for perfect traction and for braking (they'll slow down the wheels by running backward as generators). Under the hood will be a bank of fuel cells. And the gas tank may hold gas, not gasoline. How soon? Five years is optimistic, but not wild.

Fuel cells could also move into your house. Most of your electric bill now goes, not for the cost of generating electricity (that's very cheap), but for construction and upkeep on the wires that connect you to the power plant. Cut out the wires—put the power plant in your cellar—and you might save money.

*Another possibility*, more intriguing but more distant, is marriage of fuel cells to sunlight-to-electricity converters (the kind used in satellites). They seem to be made for each other. The solar generator would pour out juice during the day, when you don't need it much. But you might store this electricity by running a fuel cell backwards: Electricity coming in would decompose water into its hydrogen and oxygen.

This kind of scheme is the engineer's delight: a closed system. Water changes to hydrogen and oxygen, then back to water again. The only thing that gets used up is sunshine—and the sun shines whether you put it to work or not.



## CAR DESTROYED BY UNDER-HOOD FIRE

Newark: — A car driven by James Walder was today set on fire by an explosion under the hood. According to a Police Emergency Squad and firemen called to the scene, the flames were caused by carburetor back-fire that ignited the air filter.

ADVERTISED IN  
**LIFE**



## Don't take a chance!

Install a

# LEE



*Flame-proof* "Micralytic"  
**CARBURETOR AIR FILTER**

Engine back-fire causes "carburetor cough" and that's when ordinary air filters burst into flame! Play it safe — install a LEE Flame-proofed Carburetor AIR FILTER! Sold wherever cars are serviced and in accessory stores.

LEE FILTER CORP. Dept. 5D No. Arlington, N. J.

## ADJUSTABLE MITER BOX & CORNER CLAMP

2 TOOLS  
IN ONE

Adjusts  
to any  
angle!



### No. 44—COMBINATION MITER BOX AND CORNER CLAMP

Holds the wood and holds your saw. Uses any handsaw for accurate cuts from 0° to 180°. Full 3" capacity. Sides of joints exposed for nailing, gluing.

**\$2.75**

PPD.

No. 33 Works the same as No. 44, but without saw guide attachment.

**\$1.75** ppd.

## SAW SHARPENING IS EASY

Super Filer No. 11 joints and sharpens hand and circular saws 6" to 10" with all teeth correct in height, depth, pitch, bevel. When file hits steel roller, teeth are finished. Saw runs true with no side pull. Includes 8" file.

**\$9.95**

PPD.



"TRU-CIRCLE" saw set automatically sets teeth at 10° or more.

**\$2.95**

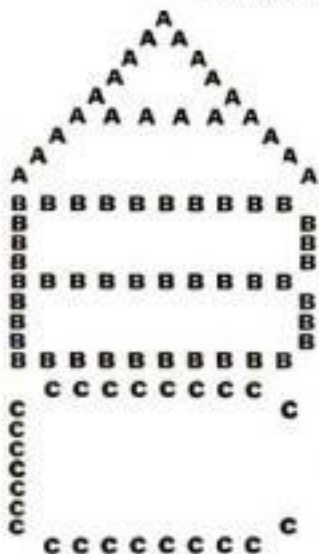
PPD.

MONEY BACK GUARANTEE

A. D. McBURNEY, 5908 Hollywood Blvd., Hollywood 28, Cal., Dept. 5-20

Your Postmaster, ROBERT K. CHRISTENBERRY, Suggests:

FOR FASTER AND MORE EFFICIENT POSTAL SERVICE . . .  
LEARN THE "A.B.C.'S" OF GOOD MAILING HABITS!



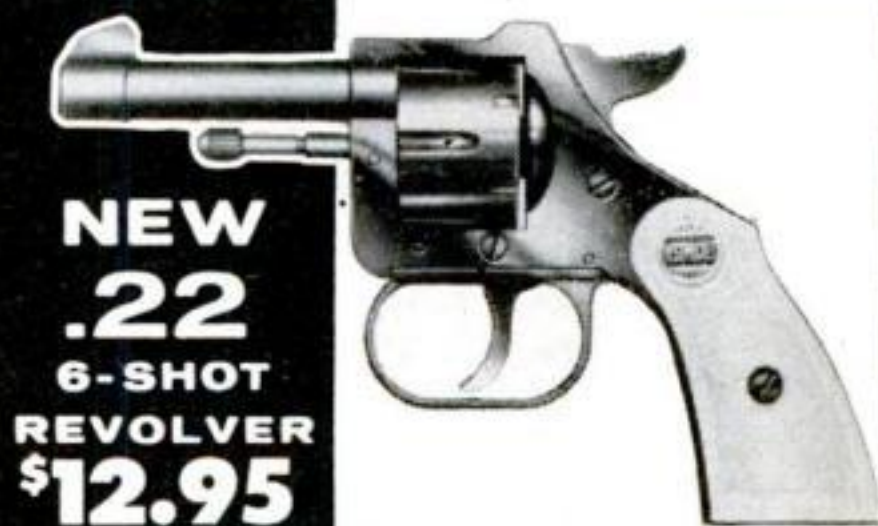
postal delivery zone number helps speed your mail

certain to include your return address on all letters and packages!

that the delivery address is correct and complete!

—AND—

MAIL EARLY IN THE DAY—IT'S THE BETTER WAY!



**NEW  
.22  
6-SHOT  
REVOLVER  
\$12.95**

Fires both .22 short & long ammo. This sensational NEW 6-shot Rosco Vest Pocket .22 revolver is a tremendous value at 3 times its price. Made in W. Germany, it is a tight, well-made, exceedingly accurate handgun. Fires easy-to-get Win., Rem. Western & Peters .22 Long & Short ammo. Features side gate loading, trigger adjustment, screw-in ejector rod. Has STEEL RIFLED BARREL with blade front sights. Easy and fun to shoot. Terrific for target shooting, varmint hunting or as a home defense weapon. Only \$12.95. Leather holster \$2.25. 100 rds. of .22 short ball ammo only \$1. Shipped F.O.B., Los Angeles express charges collect. Send cash, check or M.O. COD's require \$7.50 deposit. Satisfaction guaranteed. **Purchasers must be 18 years old.** Res. of L. A. & vicinity, please purchase at our store.

**SEAPORT TRADERS, INC., Dept. PS-2**  
1221 S. Grand Ave. Los Angeles 15, Calif.

## NEW FIBERGLASS BOAT LAPSTRAKE & PLYWOOD KITS

Most complete line. 8' to 23'. Prams, row-boats, outboards, cruisers

MAIL 50c (coin)  
REFUNDABLE  
for BIG COLOR  
CATALOGS



U-MAK-IT, DeLAND, FLORIDA • DEPT. 11

## NOW! HOME CRAFTSMEN CAN OWN THIS PROFESSIONAL ARC WELDER

EASY TERMS  
ONLY \$98<sup>50</sup>  
F. O. B.

Now you can own a Trindl full 125 amp Industrial Welder at a price far less than smaller machines. With a Trindl 125A you can weld metals up to 1/2 inch thick. Operates off either 110 or 220 volt line, properly wired. 16 heat stages from 20 to 125 amps. Make and repair anything of metal around the home, garage, farm or shop, like a professional. No previous experience or training needed. Full "do-it-yourself" instructions with each machine. Complete only \$98.50 f.o.b. factory, or write for details. Trindl manufactures a complete line of heavy duty welding machines. Dealer inquiries invited.

**TRINDL PRODUCTS Ltd., Dept. T3-B**  
1807 So. Clark St., Chicago 16, Ill.



**Trindl**  
"100-TESTER" ARC WELDERS

**Guaranteed**  
12 MONTHS  
IN  
CONTINUOUS  
OPERATION

**Trindl**  
"100-TESTER" ARC WELDERS

**FREE**

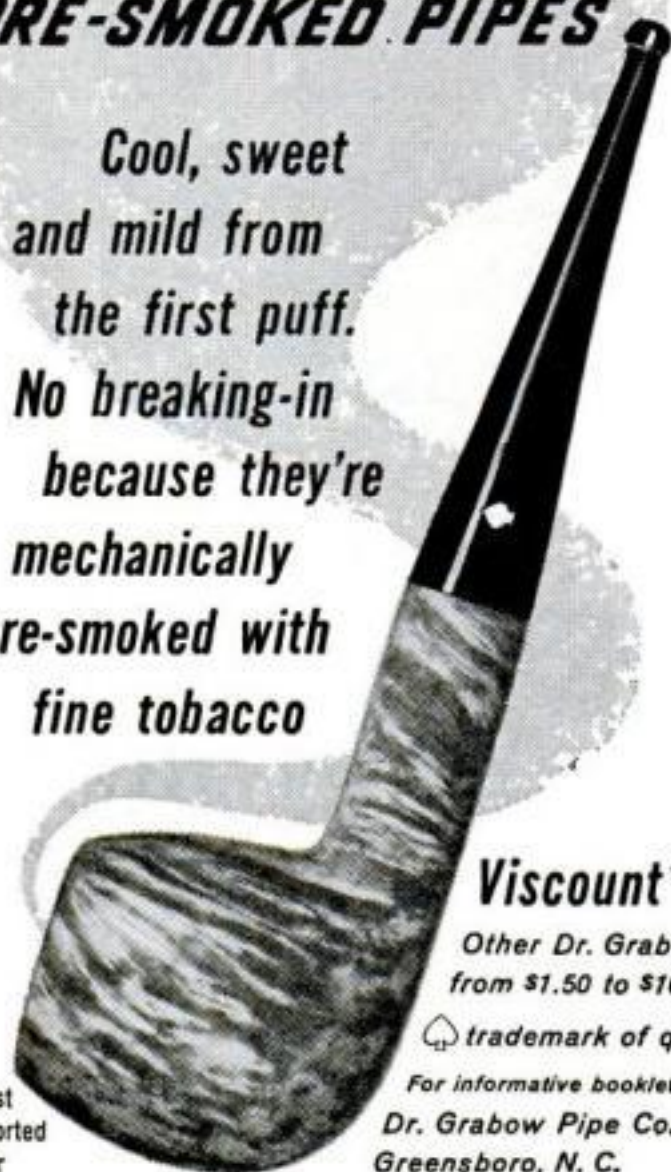
WRITE FOR  
COMPLETE  
DETAILS AND  
EASY PAY PLAN



# Dr. Grabow

## PRE-SMOKED PIPES

Cool, sweet  
and mild from  
the first puff.  
No breaking-in  
because they're  
mechanically  
pre-smoked with  
fine tobacco



**Viscount \$5.**

Other Dr. Grabows  
from \$1.50 to \$10

☞ trademark of quality

For informative booklet write:  
Dr. Grabow Pipe Co.  
Greensboro, N. C.

finest  
imported  
briar

## KIT BOATS



CREDIT  
TERMS

FREE FREIGHT—SAVE 2/3

**CRAIG-CRAFT, Tonawanda 1M, N. Y.**

Boat Plans  
Patterns  
Frame Kits

**KIT CATALOGS**—Over 50 Models—Pre-assembled. Runabouts, Cruisers, Fishing (8' to 19'). Anyone can assemble. Complete Marine Accessories, Fiberglass plastics, Trailers, Paint, etc. Also Catalog on 50 Modern Plans and Patterns. Prefab Frame Kits—

SEND 10c FOR 2-COLORED CATALOGS

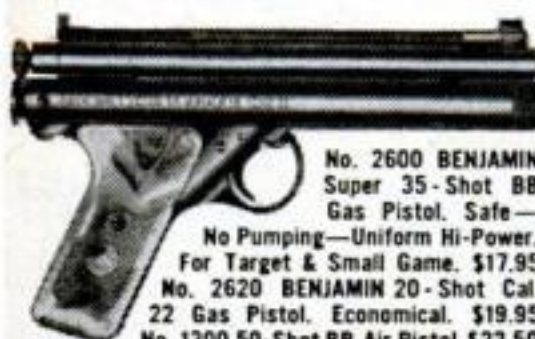
**FOCUS YOUR**

SMOOTH BORE BB OR RIFLED 22—AIR OR GAS GUNS—ROUND LEAD AMMO EFFECTIVE UP TO 100 FT.

**BENJAMIN**

AMAZING NEW  
**Line of REPEATERS**  
WITH THE LATEST IMPROVEMENT  
IN FAST, SURE, GRAVITY  
LOADING ACTION AND  
**PIGGY-BACK SHOT MAGAZINE**

A Shot is placed in Firing Position each time Bolt is Pulled Back and Closed. Flash Ammo Count on Full View Magazine.



No. 2600 BENJAMIN  
Super 35-Shot BB  
Gas Pistol. Safe—

No Pumping—Uniform Hi-Power.

For Target & Small Game. \$17.95

No. 2620 BENJAMIN 20-Shot Cal.

22 Gas Pistol. Economical. \$19.95

No. 1300 50-Shot BB Air Pistol \$22.50

No. 1320 BENJAMIN 35-Shot Cal. 22 Air Pistol \$24.50

**FREE** Catalog All Models Benjamin Single Shot & Repeaters—Cal. BB or 177 or 22. Also, Special Hunting & Fishing Knife Offer.

**BENJAMIN AIR RIFLE CO., 852 MARION ST., ST. LOUIS 4, MO.**

No. 3600 BENJAMIN  
Super 100 Shot BB Gas  
Rifle. Non-Toxic—Safe  
—Convenient—Uniform  
Hi-Velocity Power. —  
No. 3620 BENJAMIN  
Super 85 Shot Cal. 22  
Gas Rifle . . . \$20.95  
No. 3100 Super 100  
Shot BB Air Rifle. Adj.  
Shooting Force \$23.95  
No. 3120 BENJAMIN  
Super 85 Shot Cal. 22  
Air Rifle . . . \$25.95

\$18.95



## Nature's Big Sleep

[Continued from page 34]

called induced hypothermia, human beings are now cooled down, sometimes in ice-water baths, to permit delicate operations on the heart and brain. The cooling slows the heart rate and the flow of blood, and reduces the quantity of anesthetic needed.

● **Cancer.** Cancerous cells grow at an unnatural, explosive rate. If a way could be found to slow down or stop the growth, a great step forward would be taken. Dr. Lyman and his colleagues have transplanted human cancer tumors into the cheeks of hamsters. So far, results indicate that hibernation does slow down the growth of cancer cells; but when the hamster wakes up, the cancer resumes its rapid growth.

● **Radiation.** Other researchers have exposed hibernating animals to radiation. As with cancer, the effect is only suspended during hibernation.

● **Frostbite.** "Animals that hibernate," Dr. Lyman points out, "never get frost-bitten. We'd like to know why." One theory is that insufficient circulation causes frostbite, and Dr. Lyman may be able to prove or disprove the theory.

Late in 1959, one of his experiments had a surprising result: It showed that, despite the slow heartbeat of a hibernating animal, and the small amount of blood circulated, the animal's blood pressure was remarkably near normal. He theorizes that perhaps the arterioles—small arteries—tighten up, narrow their diameters, and help keep the pressure up.

● **Aging.** During hibernation, Dr. Lyman's chucks, squirrels, and hamsters may slow down their rate of growing old to as little as a thirtieth of their normal rate. Animals that hibernate are known to live much longer than comparable animals that do not.

● **Sleep.** It seems probable that we may learn more about this process—especially if both sleep and hibernation are controlled by the hypothalamus. Another thing: Woodchucks and other hibernators probably fall into hibernation from sleep.

Can man, observing in a laboratory, learn to imitate an art that animals took millions of years to evolve? It will take a long time, Dr. Lyman believes; it is at present remote. "But I wouldn't say," he answers, "that it's impossible."



# CUT-TO-FIT HOMES CUT BUILDING COSTS

CHOICE  
OF  
57  
DESIGNS

ORDER NOW

SAVE UP TO  $\frac{1}{3}$



INTERNATIONAL MILL AND TIMBER CO.  
DEPT. PS20 BAY CITY, MICHIGAN

Build your own home and save the builders' profit — plus savings in lumber and labor with Sterling Ready-Cut-Homes. Anyone can assemble with simple, easy to follow plans furnished. Every house complete with all lumber, roofing, nails, glass, hardware, paint, doors and windows marked ready to erect. Freight paid. Complete building plans ready for filing at low cost. Sold separately if desired. Write today!

PRICED FROM \$2150 UP  
Five Easy Payment Plans  
Send 25c for NEW COLOR CATALOG

## HOW TO TURN Concrete INTO Gold



A MUST FOR  
EVERYONE  
CONCERNED!

This MANUAL Tells You  
How To Make  
Handsome Profits  
From Concrete Items  
YOU CAN MAKE

All you need is a mold or two and a little determination. This Manual contains large, clear pictures, gives prices and description of more than 200 different molds you can buy direct from the manufacturer, AND...priceless trade secrets that make production a snap. Take the first step Today!!!

SEND ONLY \$2.00 FOR YOUR COPY  
(Rushed to you by First Class Mail)

CONCRETE MACHINERY COMPANY, INC.  
Dept PS Hickory, N. C.

## ALL NEW! 1960 Edition of Constantine's WOODWORKING CATALOG & MANUAL



Get the biggest Constantine Catalog & Manual—2000 items! World's largest source since 1812 for rare imported and domestic woods in veneers, lumber, plywoods, bandings, inlays, mouldings, carvings... hard-to-find hardware, new solid brass hardware, wood finishing and upholstery supplies, patterns, tools, woodworking materials—at bargain prices! Also exclusive Inlaid-Wood-Picture Kits... Identification Chart of 60 rare woods in color... inspiring projects, plans, etc. For all-new 1960 Catalog & Manual, send 25¢ (refunded on first order). Write today!

FREE — Year's subscription to "Chips & Chats" brings news of exciting woodworking ideas and latest offerings... Free with Catalog!

ALBERT CONSTANTINE AND SON INC.  
2050 Eastchester Rd., Dept. B-6  
New York 61, N. Y.

## ANNOUNCING:

### PORTO-POWER "ELECTRONIC BRAIN" LIGHT PLANTS



Ordinary light plants must run at full speed constantly. The ELECTRONIC BRAIN, now offered by Porto-Power, allows your plant to saunter along at a thrifty idle until you call for electricity. Then instantly... automatically, the plants comes up to full speed with a steady 115 volts of power. When the demand stops, the brain returns your Porto-Power plant back to that same thrifty idle. Saves gas... doubles engine life! Porto-Power offers all sizes & all types of light plants to 100,000 watts WITH THE ELECTRONIC BRAIN... at prices less than ordinary plants! See them at better outdoor stores everywhere. Write, enclosing 10c for our valuable catalog, and the name of your nearest Porto-Power Dealer. Model illustrated is our popular PP 12 (Manual Start). 115 v., 1300 watts

A.C. Wt. 75 lb. Priced. WITH ELECTRONIC BRAIN... \$239.50  
PORTO-POWER MFG. CO., Dept. B-26, Box 389, Burlington, Wis.

Works  
in  
seconds!



Loosens Rusted Bolts  
nuts, screws, "frozen" parts!

**LIQUID  
WRENCH**  
SUPER-PENETRANT

The super-penetrating rust solvent that quickly loosens rust and corrosion.

AT ALL HARDWARE  
AND AUTO STORES

RADIATOR SPECIALTY COMPANY  
CHARLOTTE, N. C.



## TINY RADIO PLAYS FOR 10 YEARS!



NO TUBES—TRANSISTORS—  
BATTERIES OR "PLUG-INS" NEEDED

Smaller than a pack of cigarettes, 1960 model never runs down or burns out. Guaranteed to receive local radio stations most anytime, anywhere—without EXTRA ANTENNA WIRES. Easy thumb station tuner—Perma wave detector. Chrome black plastic case. BUILT IN SPEAKERPHONE—NO SEPARATE DANGLING EARPHONE. American made and service guaranteed for 10 years.

SEND ONLY \$2.00 (cash, ch, mo) and pay postman \$4.99 COD on arrival or send \$6.99 for postpaid delivery. Sent complete—Ready to listen with 10 year guarantee. No extras to buy. Free 1000 mile antenna enclosed if you order at once.

MIDWAY COMPANY Dept. TPS-2 KEARNEY, NEBR.

SMALL! POWERFUL!

**ECONOMY  
TRACTOR**



Thousands  
In Use

Write for  
complete  
details.

Engineering Products Co.  
1005 A-2 Anoka Ave.  
Waukesha, Wisconsin

Unequaled value! Low price!

America's finest tractor. Ruggedly built. Easy to operate. 790 lbs. Borg-Warner clutch, trans. and diff 140 to 1 reduction. 40% more drawbar pull than ordinary tractors 8-1/4 H.P. engine. 20 quick change implements. HOOD, FENDERS.



## ARC WELDING WILL PAY YOU

## big profits

COMES COMPLETE—ready to weld. This potent package of performance welds, cuts, burns holes, hard surfaces, solders, brazes and heats metal. It's an ideal all-around shop welder. The Power/Weld gives you DC for

welding AND FURNISHES AC POWER simultaneously. It can also be used to provide emergency AC power. These two welders are bound to help you earn big profits—write for more details today!

HOBART BROS. CO., BOX P-20 Troy, Ohio, Phone FE 21223

LOW COST combination welder and power unit, welds or runs tools, lights, motors. Easy to use... handles all types of electrodes.

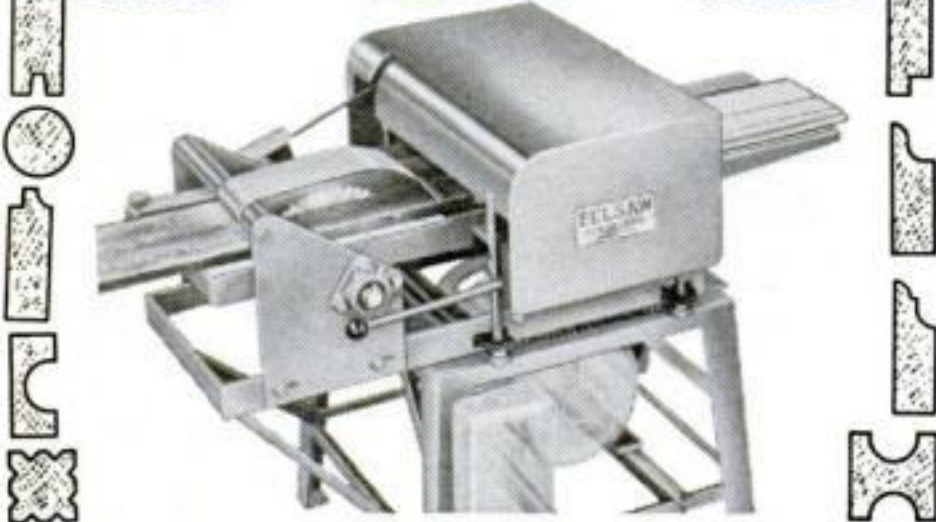




## NEW BELSAW MULTI-DUTY POWER TOOL



**SAWS PLANES MOLDS**



Now you can use this **ONE power feed shop** to turn rough lumber into high-value moldings, trim, flooring, furniture... **ALL** popular patterns.

**RIP...PLANE...MOLD...** separately or all at once by power feed...with a one horsepower motor. Use 3 to 5 HP for high speed commercial output.

**LOW COST**... You can own this **MONEY MAKING POWER TOOL** for only ..... **\$3000** down payment

Send coupon today

**BELSAW POWER TOOLS** 920 Field Bldg., Kansas City 11, Mo.  
Send me complete facts on the **MULTI-DUTY Power Tool**.  
No obligation.

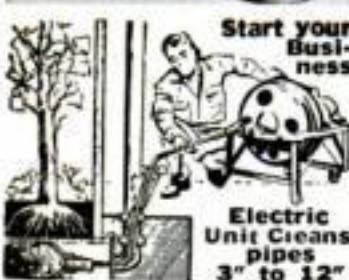
Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_



Attachable  
Cutter Blades



Electric  
Unit Cleans  
pipes  
3" to 12"

**FREE  
★  
BOOK**

## CLOGGED SEWERS REMEMBER THE COSTLY PLUMBING BILL

Chicago—Feb. 1. Just introduced is a Free Booklet on machines which enable the Home Owner, Janitor or Factory Maintenance Man to Rod-it-himself—

Yet anyone can operate this new Rodding Tool which is whirled down the drain in a few seconds. **SINKS, BATHTUBS, TOILETS, URINALS, FLOOR DRAINS, HOUSE TO STREET SEWERS** can be cleared of Rags, Grease, Paper, Sand while Cutter blades can be added for removing roots. A new discovery in Swedish Music Wire gives the rod 100% more Flexibility.

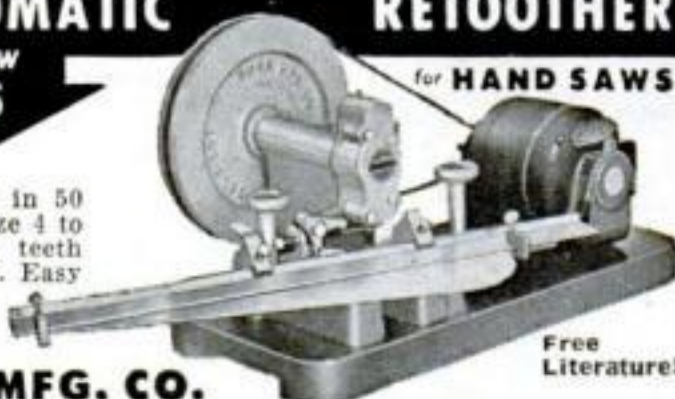
Another new unit is the Miller Electric Rodder which has patented cutters that expand automatically to the size of the pipe. It will clean out heavy obstructions in pipe diameters 3" to 12". Smaller Sizes available. But now, what are these Tools worth in **COSTLY PLUMBING BILLS SAVED**. Tear this Ad out—and write your name and address beside it for **FREE BOOKLET** on Hand and Electric Units. Obey that urge. No Agent will call. A post-card will do (Chicago Phone Kildare 5-1702)

Miller Sewer Rod, Dept. PR-2, 4640 N. Central Ave., Chicago 30, Ill.

## AUTOMATIC MAKES NEW PROFITS

## RETOOTHER for HAND SAWS

Cuts new teeth in 50 seconds—any size 4 to 16 points. Old teeth fall off as chips. Easy to operate. A perfect job.

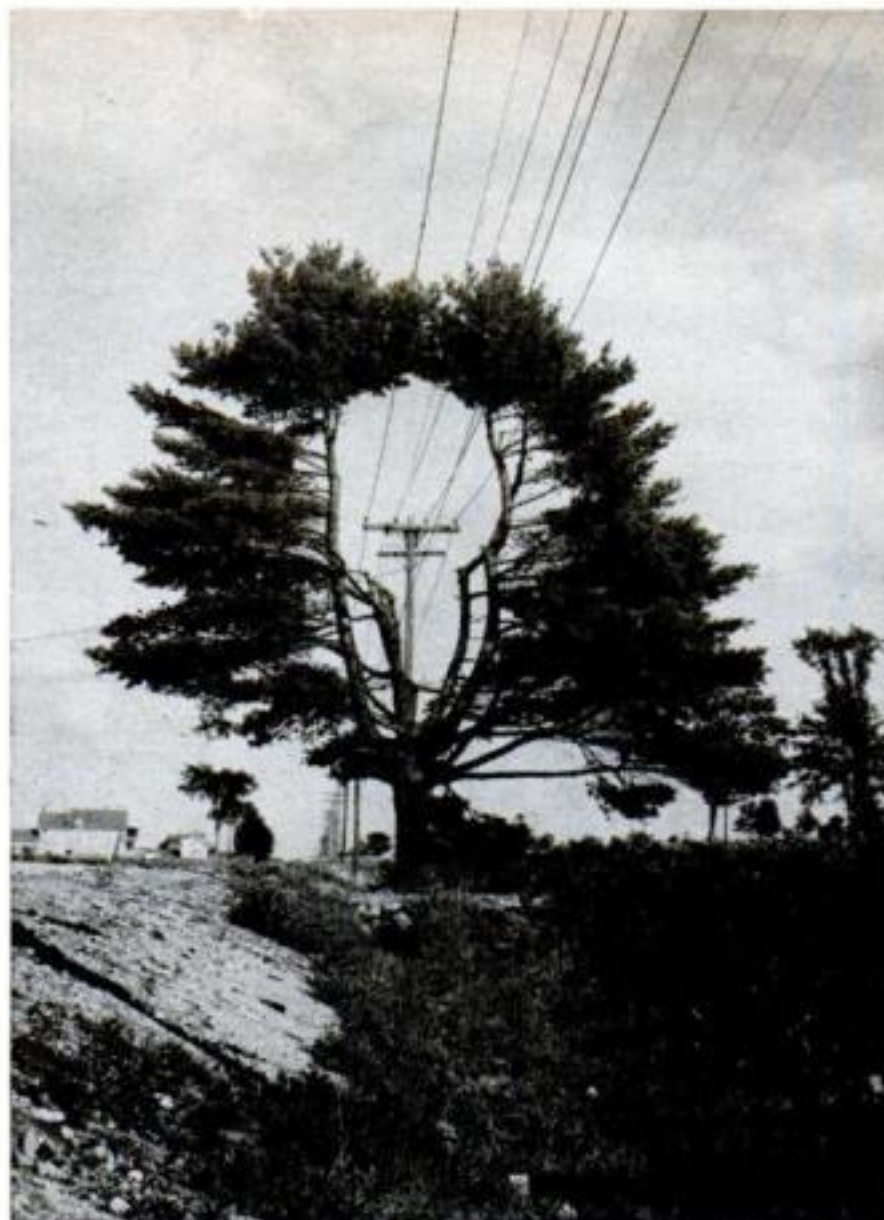


Free  
Literature!

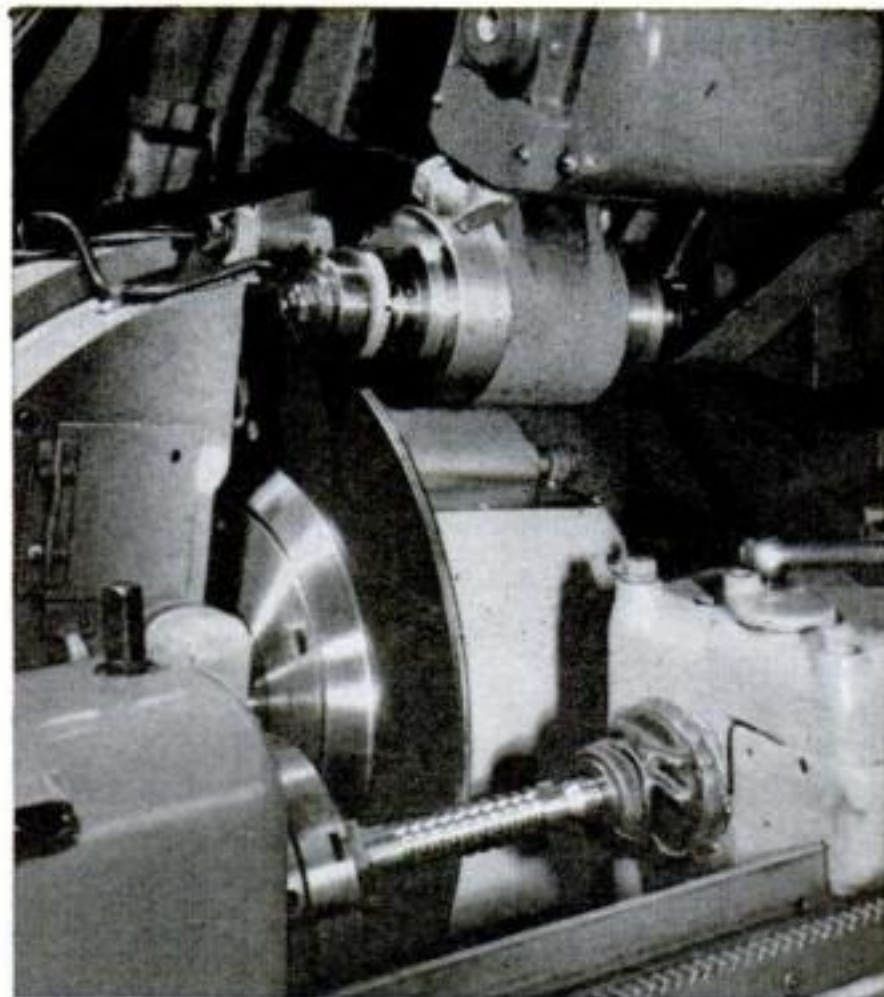
**BURR MFG. CO.**

8943-F VENICE BLVD.

LOS ANGELES 34, CALIFORNIA



**TREE SCULPTURE.** Sentiment and progress both won in stringing power lines near Gorham, Me. Instead of chopping down this old pine, linemen cut out its middle, ran their lines on through.



**NEVER A DULL MOMENT.** As this wheel cuts threads on a shaft (foreground), it is automatically sharpened by the diamond cutter above it. Jones & Lamson built it to eliminate shutdowns.



# How to get more fish... revealed in great \$100 book!

"Worth its weight in gold!"—that's what you'll say about the **OUTDOOR LIFE FISHING BOOK** by P. A. Parsons. This fact-and-photo filled book tells how, where, and when to get more trout, bass, panfish, muskie, salmon, grayling, pike, pickerel, walleye, and every other fresh water sport fish in America! Over 100 pictures, 25 chapters jammed with practical show-how data on fly casting, bait casting, spinning, trolling, wet and dry fly know-how, bugs and poppers, natural baits, ice-fishing, knots, boats, and lots more. And the **OUTDOOR LIFE FISHING BOOK** is yours for *JUST \$1.00 postpaid!* Send name, address, \$1.00 to:

**Outdoor  
Life**

Dept. PS-260  
355 Lexington Avenue, New York 17, N. Y.

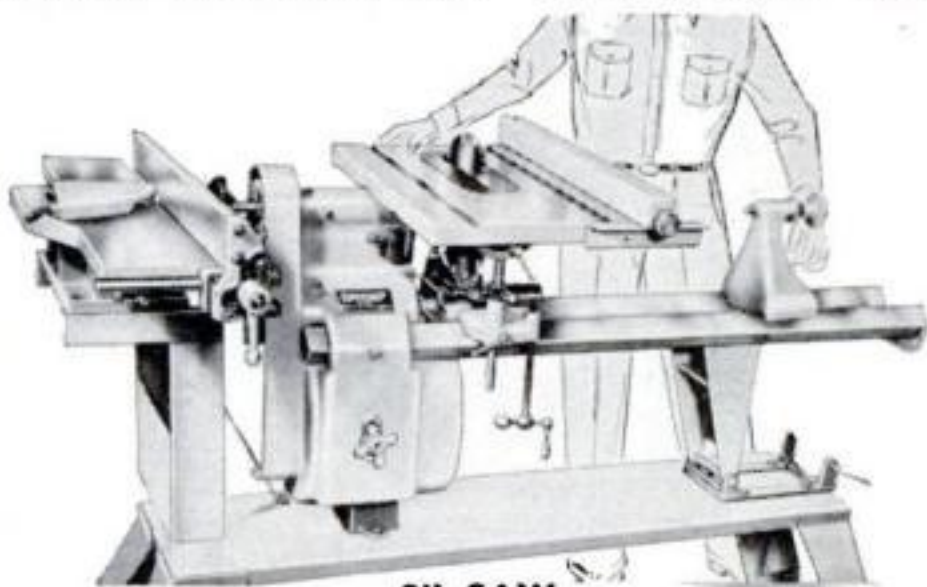
# Get a goldmine of hunting and shooting know-how in great \$100 book

Jack O'Connor, Shooting Editor of Outdoor Life Magazine, and America's top gun expert, hands you a million dollars worth of gun and shooting know-how in his **OUTDOOR LIFE SHOOTING BOOK**. It's packed with inside tips, expert advice on small-bore rifles, big game rifles, shotguns, handguns, ammunition, scopes, sighting, chokes and patterns, plenty more. Lavishly illustrated with 100 photos, diagrams, trajectory tables, ballistics charts, etc. Large format, fully indexed, handsomely printed—worth its weight in gold! And the **OUTDOOR LIFE SHOOTING BOOK** is yours for *JUST \$1.00 postpaid!* Act fast! Send name, address, \$1.00 to:

**Outdoor  
Life**

Dept. PS-260  
355 Lexington Avenue, New York 17, N. Y.

## LOOK! All New - All Precision - All Deluxe SUPERSHOP MODEL X



8" SAW

**WE PAY ALL  
FREIGHT FOR  
YOUR FREE  
HOME TRIAL**

**ONLY  
\$139.50  
EASY  
PAY  
PLAN**

Never before have you seen so much deluxe, precision-built power tool workshop at any price! Designed for the man who wants the best. Massive cast and precision-machined headstock, self-centering inverted "V" bedways (like precision metal lathes), exclusive non-friction speed changer, extra-large cast and precision-ground saw table. 100% ball bearing, lifetime-lubricated. You save by ordering direct from factory. You are invited to test Supershop Model X in your home FREE. Mail coupon or postcard for FREE brochures, photos, details, specifications, accessory list — and amazing freight prepaid FREE HOME TRIAL PLAN. All free.

**MAIL COUPON OR  
POSTCARD TODAY**



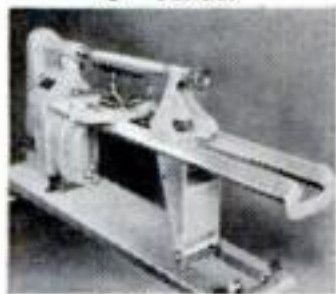
Vert. Drill Press



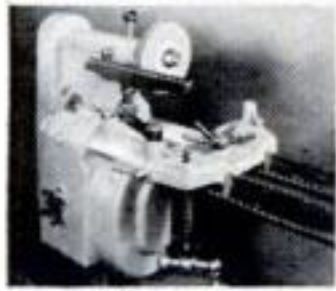
Hor. Drill Press



8" Sander



30" Lathe



5" Grinder

Power Tools Division  
UNITED INDUSTRIES, Inc.  
228 Yates Avenue  
Beloit, Wisconsin

NAME \_\_\_\_\_  
ADDRESS \_\_\_\_\_  
CITY \_\_\_\_\_



# New $3\frac{3}{4}\%$ interest on U.S. Savings Bonds

*The Treasury explains why the new ones you buy  
and the ones you own now are better than ever*

**Q:** How does the new  $3\frac{3}{4}\%$  interest rate benefit me?

**A:** With Series E Bonds, this rate turns \$18.75 into \$25.00 fourteen months faster than before. Your savings increase faster, because your Bonds mature in 7 years, 9 months.

With Series H Bonds, the 10-year maturity period stays the same but more interest is paid you each six months. With both E and H Bonds the new rate works out to  $2\frac{1}{2}\%$  for the first year and a half; then a guaranteed 4% each year to maturity.

**Q:** When did new rate go into effect?

**A:** June 1, 1959.

**Q:** Does the new rate change the Bonds I bought before June 1, 1959?

**A:** All older E and H Bonds pay more now—an extra  $\frac{1}{2}\%$  from now on, when held to maturity. The increase takes effect in the first full interest period after June 1.

**Q:** When my E Bonds mature, will they keep on earning interest?

**A:** Yes. An automatic 10-year extension privilege went into effect along with the new interest rate. This means your E Bonds will automatically keep earning interest after maturity.

**Q:** With the new interest rate, should I cash my old Bonds to buy new ones?

**A:** No. The automatic  $\frac{1}{2}\%$  increase makes it unnecessary—and in almost every case it is to your advantage to retain your present Bonds.

**Q:** How safe are U.S. Savings Bonds?

**A:** Savings Bonds are an absolutely riskless way to save. The United States Government guarantees the cash value of your Bonds will not drop, that it can only grow.

**Q:** What if my Bonds should be lost, stolen or destroyed?

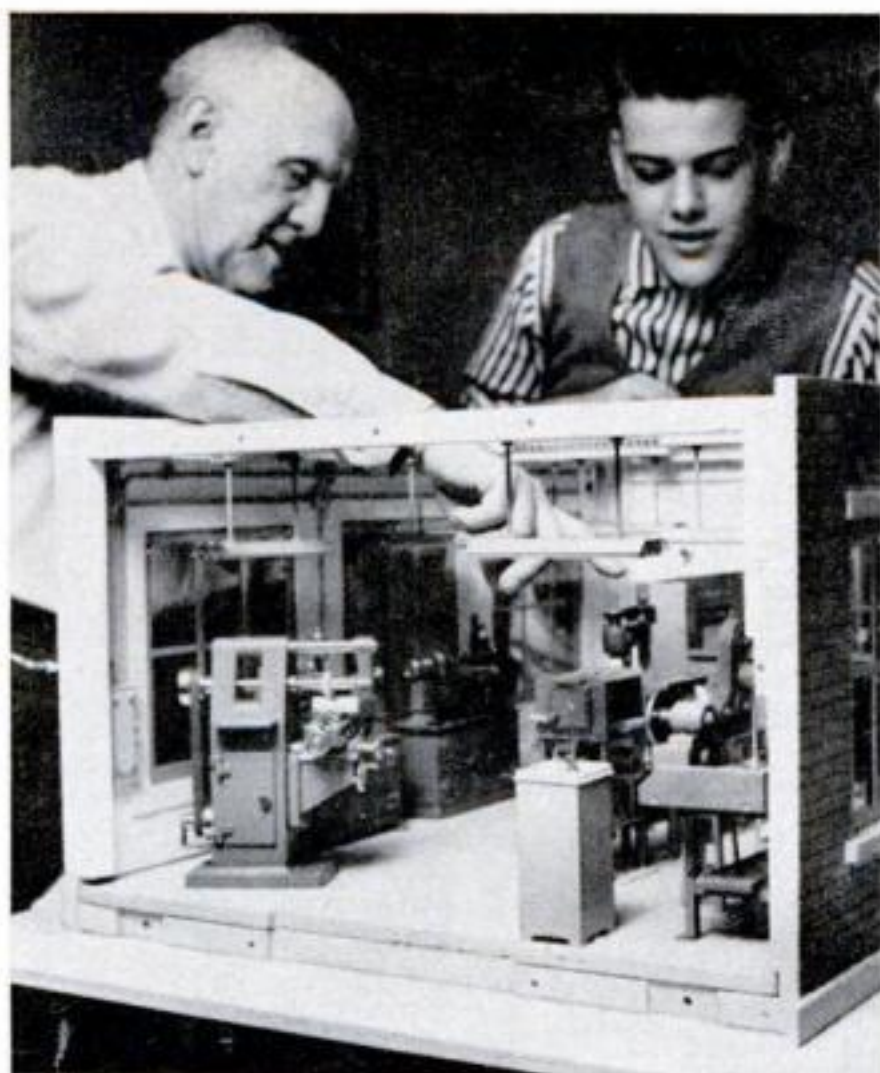
**A:** If anything happens to your Bonds they are replaced—free.

## YOU SAVE MORE THAN MONEY WITH U.S. SAVINGS BONDS

*The U.S. Government does not pay for this advertising. The Treasury Department thanks  
The Advertising Council and this magazine for their patriotic donation.*





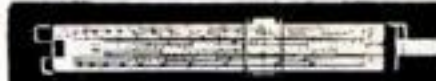


**MODEL SHOP.** A milling machine, wood and metal lathes, furnace, and tool grinder outfit this tiny machine shop built by 73-year-old Richard Kirmss of Brooklyn, N.Y. All are to exact scale and some are actual working models.



**WHEEL RAKE.** Here's an odd-looking rake from Germany that not only rakes up leaves but also pulls out weeds. Four middle wheels rotate on a cam drive. Prongs around their circumference uproot weeds as the leaves are pushed into piles.

**SAVE UP TO 85% AT PALLEY'S**



**SAVE ON SLIDE RULES**

10 inch LOG-LOG DECIMAL TRIG IMPORTED SLIDE RULE

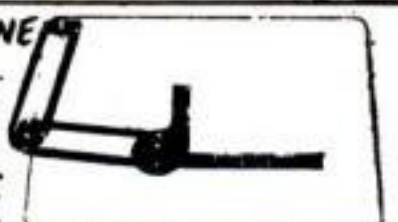
4 inch IMPORTED SLIDE RULE  
Non-warping bamboo with scales on a white nitrate face. Face scales are A, B, C1, C, D and K. Other side has S, L & T scales. In Case. **2.95**

5 inch IMPORTED SLIDE RULE  
Same scales as above rule... **3.59**

Professional Log-Log, Decimal Trig Slide Rule. Non-warping top quality bamboo with 2-color scale on white nitrate facing. Scales are L, LL1, DF, CF, CIF, C1, C, D, LL3 & LL2 on one side. Other side has LLO, LLOO, A, B, K, C1, C, D, S, ST & T. With cursor and 16 page book... **10.95**

**PORTABLE DRAFTING MACHINE**

Scientifically designed. Ideal for use in Classroom, Art Studio, Workshop, Office, Home, etc. Will easily fit in a briefcase. Has 3" and 5" scales calibrated in .0005 of an inch. Made of black anodized aluminum. Weighs only 2-1/2 lbs. Has 11"x17" drawing board. **6.95**








4 SPEED HOBBY OR BARBECUE MOTOR  
Extra rugged, precision built electric motor for your home workshop, barbecue, lab, etc. Uses 110 volt, 60 cycle current. Has 4 take-off shafts turning at 5, 25, 150 and 4000 RPM. Another Palley Extra Value. Worth \$14.95 - NOW **8.88**

**NEW HULL AUTO COMPASS**

Here's a guaranteed precision Auto Compass. Made to mount on dash board or above the windshield. A floating card type compass. Graduated dial has 36 divisions - each division represents 10 degrees. Has external adjustments to compensate the compass. With adjustable mount bracket and instructions. **\$5.95 VALUE**

**NOW 3.88**

**SPECIAL GOV'T SURPLUS BARGAINS**

			
A - British combination PICK-HOE tool - \$1.29 ea. 2 for \$2.29	B - Army BAYONET with scabbard. Has 17" blade... \$2.29	C - Army MACHETE w/ Vanadium steel 22" blade & sheath... \$1.98	D - Special Swedish folding BAYONET. 7" blade... \$1.98
	E - Navy fighting KNIFE. 6 1/2" blade, dbl. edged at point... \$2.98 Leather Belt SHEATH for Navy Knife... 1.00		
F - Army FIELD SHOES - Natural cowhide. Treated & waterproof Sizes: 10B, 10 1/2 B, 1 1/4 B - \$4.44 All other sizes... \$5.95			

**U.S. ARMY MUKLUKS**

Keep your feet warm in the coldest weather. Made of waterproof canvas with a felt inner sole. Has draw-strings at the top, instep and ankle for a snug fit. Sizes are Small, Med., Large.



**\$1.69 PR.**

**ARMY SURPLUS WINTER BOOTS**

Uppers are heavy grade white felt with sturdy canvas cuff trimmed in white leather with straps and buckles. The midsole is extra thick felt with a heavy duty rubber outer sole. Size: Extra Large only.



**3.88 PR.**



**SURPLUS U.S. ARMY FLEECE LINED WINTER COAT**

Made of heavy duty Army Drill, coated with special plastic to make it waterproof. Lined with soft, warm sheepskin fleece. Has a double breasted front with a four button closure. Two slash pockets and two large flap pockets. Select from sizes 42 through 46. Cost Gov't approx. \$25.00

**ONLY 17.88**

**STRATOPOWER HYDRAULIC PUMP AND MOTOR**

Designed for intermittent use with pressure rating of 1500 PSI. Capacity 2.4 GPM. Motor operates at 26 V. DC, 80 amps, 1750 RPM. Ports - Inlet 3/4" AN; Outlet 3/8" AN...



**ONLY 22.50**

**HYDRAULIC CYL.**

Double Action Hydraulic Cylinder. Will stand 2000 PSI. Steel barrel. Ideal for hydraulic press. Has 2-1/2" bore, 2" stroke, 1-5/8" shaft, 19" length. Catalog No. H-240

**Palley Cat. price \$12.75... 9.95**



**STRATO POWER HYD. PUMP & MOTOR**

A variable displacement, piston type pump. Delivers 7 1/2 GPM at 1800 RPM. Maximum output is 15 GPM at 3600 RPM. Has full flow at 1275 PSI. Ports: 1" AN on suction, 5/8" AN on pressure, 3/8" AN on case drain. NEW cond. **ONLY 22.50**



**AIR SPECIAL SALE OXYGEN**

**10,000 STAINLESS STEEL GI TANKS**

Used - **11.95 EA.** EXCELLENT Condition! Ideal for Air, Oxygen, Chemicals (including acids), as Buoys or floats, etc. Capacity 2100 cubic inches, 9 gallons. Tested to 450 PSI. 1/4" ports each end. Length 24", diameter 12", weight 19 lbs. each.

AVAILABLE in NEW condition! Write for special quantity prices and SAVE!

**palley's**

2263 E VERNON AVE., DEPT. PS-20, LOS ANGELES 58, CALIFORNIA

TO ORDER - Send check or M.O. 1/2 deposit with C.O.D.s. All prices are F.O.B. Los Angeles Warehouse. All items sent postage or freight collect.



World's greatest classified

# opportunities

80 DIFFERENT  
CLASSIFICATIONS . . .  
P. S. SELLS TO ALL

POPULAR SCIENCE MONTHLY  
355 LEXINGTON AVE.  
NEW YORK 17, N. Y.

Classified Ads only \$1.15 per word insertion, payable in advance. Minimum ad 10 words. To be included in April issue, copy should be in our office by February 23. No cancellations accepted after February 15. Address orders to O. K. Kelly, Classified Adv. Mgr.

## 1 AUTOMOBILES & MIDGET CARS

AUTOMOBILE speed, acceleration, braking formulas booklet, \$1.00. McLay, 13 Franklin, Janesville, Wisconsin.

USED Car Buying Guide. "What to Look For In a Used Car." Send 25c to Tek Enterprises, 304 Glenbrook Rd., Stamford, Conn.

CROSLEY or Foreign car parts catalogue. Parts discount club. Box 7, Elmont, New York.

READ "Cars & Cycles." Buy, sell, swap—specialized cars, motorcycles, parts, equipment—20c. Ads 30 words—\$1.00. Quillen, PS-206 S. First, N. Manchester, Ind.

CATALOG on Parts Kits for Golf Buggy or Jr. Sports Car 25c. Indus Corporation, 1815 Madison, Indianapolis.

CROSLEY Parts—New—Used. Gene's, 1915 So. H. Ft. Smith, Ark.

NON-PROFIT organization offers automobile literature—old, modern and foreign; dealer books, service manuals, glossy photographs; free motor magazines. Write immediately, get on free mailing list. Auto Maniacs, Inc., Stockbridge, Mich.

SUBSTANTIAL savings now possible when buying new car. Convincing literature free. Price Research Bureau, Box 15, Tonawanda 3, N. Y.

## 2 AUTO SUPPLIES & EQUIPMENT

SAVE money on Jeep and army truck parts. Large inventory Catalogs for Jeep and G.M.C. owners. American Auto Parts Co., 1830-PS Locust, Kansas City, Missouri.

GIANT Auto Parts Catalog. Thousands special accessories . . . speed, power, performance. Mileage, custom equipment. Send 25c (refundable). Newhouse Automotive Industries, 5805-PS-2 Beverly, Los Angeles 22, Calif.

AUTO shop welding repair training in world's largest non-profit school. Low tuition. Free booklet. Hobart Welders, Box P-201, Troy, Ohio.

AMAZING discovery. Master Glaze, puts brilliant glass like surface on cars. Free Sample, information. Big commissions. Master Glaze, Dept. 921, 7720 Harwood, Milwaukee, Wisc.

REVOLUTIONARY safety device. Prevents brake failures. Precision engineered. Easily installed. Fully guaranteed. \$9.95. Safety Brake Corporation, Box 3024, Oklahoma City 5, Oklahoma.

HYDRAULIC Jack Repair Kits—Free Catalog. Hydraulic Parts Supply, Box 4104, El Paso, Texas.

1909-1934 FORD Parts. Illustrated catalogue 50c. Mark Auto, Layton, New Jersey.

LUBRICATE your car for 2c. Build your own lube system. Complete plans \$1.00 (refundable). Karr-Lube, P.O. Box 4134, Birmingham 6, Ala.

POSITIVE Starts! Flooded, Cold, Wet! Agents Wanted. Information 10c. Haes, 4624 Rhawn, Phila. 36, Penna.

## USE THIS HANDY INDEX TO FIND WHAT YOU WANT

Advertising, Agencies for Advertisers . . .	53
Agents Wanted . . .	43
Antiques, Relics & Indian Goods . . .	29
Astronautics . . .	5A
Authors Service . . .	52
Auto Supplies & Equipment . . .	2
Auto Trailers . . .	3
Automobiles & Midget Cars . . .	1
Aviation . . .	5
Boats, Outboard Motors . . .	11
Body-Building Courses, Jiu Jitsu, Etc. . .	12
Books & Magazines . . .	23
Business Opportunities . . .	37
Business Service, Information, Name Lists . . .	50
Buy It Wholesale . . .	38A
Cameras, Photo Supplies . . .	34
Camping Equipment & Tents . . .	16
Cartooning, Sign Painting, Chalk Talks . .	54
Coins & Currency . . .	26
Color Photo Finishing . . .	32A
Contests . . .	46
Detectives . . .	47
Do-It-Yourself . . .	66
Dogs, Birds, Hamsters & Pets . . .	17
Educational & Instruction . . .	45
Electrical Supplies & Equipment . . .	7
Engineering Services . . .	60A
Engines, Motors, Etc. . .	10
Farms, Other Real Estate . . .	19
Field Glasses, Telescopes . . .	14
For Inventors . . .	60
For Sale Miscellaneous . . .	71
For the Home . . .	69
Formulas, Plans, Etc. . .	39
Garden Tractors . . .	10C
Geiger Counters, Treasure Finders . . .	77
Help Wanted Reports . . .	42
High-grade Salesmen . . .	44
Hobbies, Collections . . .	31
Home Craftsman . . .	65
Hypnotism . . .	24
Inventions Wanted . . .	61
Jokes, Games, Novelties, Etc. . .	24A
Language Outfits . . .	48
Live Bait . . .	18
Machinery, Tool Supplies, Etc. . .	9
Magic Tricks, Puzzles, Etc. . .	25
Minerals & Precious Stones . . .	30
Miscellaneous . . .	79
Models, Model Supplies . . .	64
Money-making Opportunities . . .	38
Motion Pictures, Slides, Sound Equip. .	33
Motorcycles, Bicycles & Supplies . . .	4
Music, Song Writers & Records . . .	35
Of Interest To Women . . .	70
Old Gold, Jewelry, Watches . . .	67
Old Stamps Wanted . . .	27
Personal Photo Finishing, Photocopies, Etc. .	80
Plastics . . .	40
Printing, Multigraphing, Etc. . .	57
Printing Outfits, Supplies . . .	58
Profitable Occupations . . .	22
Radio, TV, Supplies & Equipment . . .	36
Razor Blades, Shavers . . .	74
Remailing Service . . .	80A
Rubber Stamps & Office Supplies . . .	56
Science & Chemistry . . .	41
Sporting Goods, Guns, Fishing Tackle, Etc. . .	15
Stamp Collecting . . .	28
Surveying Instruments . . .	9B
Swap . . .	79B
Tattooing Supplies . . .	75
Tobacco & Pipes . . .	68
Trigonometers . . .	9A
Typewriters & Office Machines . . .	55
Wanted to Buy . . .	72
Watch Repairing . . .	78
Wearing Apparel . . .	73
Welding, Soldering . . .	8

STOP Car Thieves with the Police Auto Alarm. Details Free. Warfield, Dept. PS, 630 Stanley Avenue, Brooklyn 7, N. Y.

"RING-Valve Job" while driving, \$6.00 postpaid. Guaranteed!! (9th successful year.) Yellow Cab test-proven. Motaloy, Grantham 27, Penna.

"RING-Valve Job" while driving. Only \$3.00 delivered. "World's only (patented) product of its kind." "Lachapelle's." "Over million new, repeat sales, fourteen successful years" Money back guarantee. Beware of imitations. Free information. Joe Dillon, National Distributor, Box 323-E, Bridgeport, Ohio.

AUTO Seat Safety Belt. Airplane type. By world's largest belt manufacturer. Regular retail \$11.95; Special \$6.95. Buy 2—\$6.50 each! First quality. Postpaid. No C.O.D. Money-back guarantee. Austin-Sudfield, Box 337, Short Hills 1, New Jersey.

BUILD high-rate battery charger for as little as \$15.00. Plans \$1.00. Graff Enterprises, Box 3, Omaha 7, Nebraska.

JUST Out! New 388-page, illustrated catalog offering savings up to 50 per cent on over 100,000 auto parts and accessories, many hard to get. All makes (1920 to 1960 models), trucks, foreign and sport cars. Also Hollywood accessories, custom styling, hi-speed equipment. Send 25c for postage, packing—refundable on first order. Whitney, 1919 PS-2 Archer, Chicago 16, Ill.

## 3 AUTO TRAILERS

A NATURAL for sporting goods, boat, hardware, auto dealers, service stations, ambitious individuals. Become dealer for nation's number one camping trailer. Sets up into complete camp in just one minute! Dealer details by return airmail. Hellite Trailers, 1511 South Sacramento, Lodi, California.

## 4 MOTORCYCLES, BICYCLES AND SUPPLIES

RECONDITIONED Motorcycle Motors. Chrome accessories. Complete stock Indian parts. Expert rebuilding. Fast service. Indian Motorcycle Sales, Kansas City 27, Missouri.

GOOD Doodlebug motorscooter \$35, Mo-Ped \$75, Gasoline Buggy \$60, Boys' Midget Car \$35, Briggs engine \$5, Whizzer \$10. (Mailorder only.) Send \$25c (35c for First Class Mailing) for Directory-Catalogue Number 93, listing these and Hundreds of Other Bargains, homebuilders parts, plans, etc. Midget Motors Directory, Athens, Ohio.

DRASTICALLY reduced: "Tessy" motorscooters \$299.50 (list price: \$415.50). "Contessa" motorscooters \$399.50 (list price: \$549.50). Famous "Leopard" motorbikes only \$199.50. Newest illustrated catalog 25c. Motorcycle Import Corporation, P. O. B. 1950-B, New York 17.

## 5 AVIATION

AVIATION Surplus bargain catalogue. One dime. Box 22PS1, Thomasville, Penna.

THE Bush Pilot, Alaska's Aviation Magazine features stories about bush flying. Published monthly. \$3.50 per year. Box 3535, Anchorage 6, Alaska.

REWARD up to \$100.00 for information. Wanted: old airplanes and engines or parts. Condition not important. The older the better. Chet Mael, Portage, Wisconsin.



# POPULAR SCIENCE OPPORTUNITIES

DUCTED fan design. Used in Air Sleds and Flying Platforms. Specifications and Six pages of drawings, \$2.00. Tyna-Turbine, Box 373, Chandler, Arizona.

BUILD one man jet helicopter. Plans \$3.00. Levin, 3200 Ingleside, Baltimore 15, Md.

HOME BUILT Helicopter Handbook. Homebuilt Helicopter Directory. Homebuilt Airplane Directory. \$1.00 Each. Urshan, Box 4332 N.P., San Diego 4, California.

BUILDING your own high performance sport plane is easy with our new simplified blueprints and detailed instructions. No experience required. Four economical models, one, two passenger, aerobatics. For complete details, brochures, photographs, 3-views, F.A.A. regulations on homebuilt airplanes. Mail \$1.00 (postal, packaging expense) to Stits Aircraft, Box 3084S, Riverside, California.

PROPELLERS, plans, supplies for airboats and snowplanes. Latest designs, prompt delivery. Catalog 25c. Banks-Maxwell, Box 3301G, Ft. Worth 5, Texas.

AIR Sled Plans. 7 views, photos \$5.00. Aeromobile, Neponset, Illinois.

## 5A ASTRONAUTICS

ANTI-GRAVITY engine. Completely designed. Diagrams, details, physics, plus "Man in Flight." Send \$2.00 today—Knowledge, 2900—9th Street, Rock Island, Illinois.

GRAVITY latest undisclosed theories and information \$1.00. G. and P. Research Lab., Box 674, Bristol, Tennessee.

GUIDED Missile Engineering Book. 486 Pages. (1958). Guaranteed. \$10.00. Mathematics, Box 52, Woodlyn, Penna.

## 7 ELECTRICAL SUPPLIES & EQUIPMENT

ELECTRO-Scribe! Engraves all Metals. \$2.00. Beyer Mfg., 10511-C Springfield, Chicago 43.

ELECTRICIANS! Bend conduit easily, correctly. Latest "Simplified System" \$3.00. William Goforth, Box 455A, Clarksville, Tenn.

APPLIANCE Parts Wholesale. Illustrated Catalogue 25c. SECO, 26 South 20th Street, Birmingham 3, Alabama.

LAMP parts. Wholesale. Thousands of items for repairing, converting. Catalog 25c. Brown Lamp, Box 305-D, Clayton 5, Missouri.

## 8 WELDING, SOLDERING

ACETYLENE Welding Outfits — New, Arcwelders. Eagle Welding, Dept. 42, 5085 Broadway, Chicago 40, Ill.

WELDING Gloves and Garments. Direct from Factory to Welder. Write for Free Catalog. Since 1920. Wix-Merit Glove Company, 1119 Seventh Street, Oakland 23, California.

WELDERS, 110-220. Welds 1/2". \$39.50. Morris, 1070 Inner Drive, Schenectady, New York.

FREE Catalog. welders, welding kits. Build 350-ampere welder using aircraft generator, plans 25c. Agents wanted. Dunbar Manufacturing, Minneapolis 8, Minnesota.

BUILD efficient 350-ampere welder. Guaranteed plans 25c includes factory discount catalog. Kits, welders, \$77.90 up. LeJay Manufacturing, Minneapolis, Minnesota.

## 9 MACHINERY, TOOL SUPPLIES, ETC.

ELECTRIC Drill Grinder. Circular Free. Tool Salesmen, Dealers Wanted. Travis Tool Company, Sidney, Iowa.

## 9A TRIGONOMETERS

ENGINEERS, Draftsmen, Students: Triangulator Makes Trigonometry Easy. \$1.25. No C.O.D. Trical, Box 67, Buffalo 15, New York.

## 9B SURVEYING INSTRUMENTS

NEW And guaranteed factory rebuilt transits and levels, sale or rent, with purchase option. We will repair, trade or buy old instruments. Write for list PS 20, Warren-Knight Co. (Manufacturers of Surveying Instruments), 136 N. 12th St., Philadelphia 7, Penna.

## 10 ENGINES, MOTORS, ETC.

DIESEL Injector Parts and Fuel Pumps Wanted GM51-53-71-110. Mayer, 7120 Carnegie, Cleveland 3, Ohio.

REPAIR electric motors. Interesting, profitable. Free details. Modern, Box 8715, Kansas City 14, Mo.

REWIND Motors Yourself. Complete Instructions, \$1.00. Lewis Mfg., Howell 11, Michigan.

LAUSON-Clinton Engines. Clutches. Gear Boxes. Go-Karts. Wholesale Catalogs 25c. Loren Products, Danville, Illinois.

## 10C GARDEN TRACTORS

BUY at Discount. Nationally known Garden Tractor. Eliminates all hand hoeing, also tills. Thousands satisfied users. Patented. Discount Catalogue Free. Autohoe, DePere 69, Wisc.

## 11 BOATS, OUTBOARD MOTORS

NEW, used, rebuilt marine motors. Marine conversions, fittings. Free Catalog. Stokes Marine Supply, Dept. 23, Coldwater, Mich.

FULL size, cut-to-shape boat patterns, blueprints, 7 1/2-38 feet. Big new 88 pg. illustrated "Build a Boat" Catalog of Naval architect-designed Catamarans, Cruisers, Runabouts, Skiffs, Outboard Boats, Sailing, Racing, Houseboats. 50c. "How to Build a Boat" Booklet, \$2.50. Equipment Catalog, \$2.00. Cleveland Boat Blueprint Co., Dept. A-77, Box 1651, Cleveland, Ohio.

BOAT Plans—Full Size Patterns—Frame Kits. Modern Inboards and Outboards for amateur builders. Complete New Catalog 50c or specify requirements. Glen Marine, 9152 Rosecrans, Bellflower, Calif.

SAVE Money. New, used outboard motor parts. Send wants. Stamp appreciated. Outboard Motor Mart, 229-M State, Boston 9, Mass.

SAVE! Save! Save! World's Finest Boat Kits—25% less! Satisfaction Guaranteed! Write for free color catalog. Dept. PSM-260, Taft Marine Woodcraft, 636 39th Ave., N. E., Minneapolis, Minnesota.

FIBERGLAS Boat Covering. wholesale prices. Free literature and samples. Seifert's, Box 31X, DePere, Wisconsin.

WHOLESALE Direct From the Factory. Fiberglass runabouts, fishing boats, pontoon boats, house-boats and boat trailers. Build it yourself: pontoons only—molded hulls only. Tremendous savings on complete package units. Free catalog. Osage Mfg. Co., Box 117-P, Osage, Minn.

SMALL Steam Launch Boilers. Circular 10c. Ship Models Ltd., Andover, Mass.

NOW, Fly your boat. Easily installed kit converts your boat to a flying boat. Send \$1.00 for photographs Flying instructions. Gyrocrafte Inc., 1932 Nelson S.E., Grand Rapids, Michigan.

300 BOAT Plans, Patterns Catalogs \$1.00. Outboard Motors, \$62.00. Marinecraft, Box 161-P, Brighton, Mass.

## 12 BODY-BUILDING COURSES, JIU JITSU & ATHLETIC EQUIPMENT

BUILD powerful arms, chest, shoulders! 22 exercises, \$1. Fonsad, Box 601-C, 1100 Market, Wilmington 99, Delaware.

FREE Muscle building information. Bodytone, Box 638A, North Miami, Florida.

DEADLIEST Oriental Fighting arts. Using only Breath, Sand, Straws, Pebbles. Develop strength. Break planks bare-handed utilizing Karate, Kung-Fu mysteries. \$3.98. Oriental Book Sales, P. O. Box 1183, Oakland 7, Calif.

DEVELOP Powerful grip. Increase arm measurements. Amazing Grip-A-Ciser \$2.98. Saxon, Freeburg, Ill.

PUSHED around? Don't take nonsense from bullies. Surprise them. Easy when you know Police Jiu Jitsu. Complete fully illustrated course in one volume as taught police and armed forces. Send \$1 now. Satisfaction guaranteed. Books Publishing Co., Amityville 39, New York.

BUILD powerful arms, shoulders, back, legs, Herculean Body. Two exercises, ten minutes daily. Developed by Physical Culturist. \$1.00. E. Benfield, 2401 Randolph, Alexandria, Va.

## 14 FIELD GLASSES, TELESCOPES

DYNASCOPE—Amazing world famous reflector telescope. Request free brochure. Criterion, Dept. DS-69, Hartford, Conn.

WAR Surplus bargains! Millions of lenses, instruments, telescopes, binoculars, components and complete line of astronomical telescope items. World's greatest optical market place! Send only \$1.00 for beginner's 10-lens kit and big instruction booklet Stock 2-CN. Write for catalog-CN Free! Edmund Scientific Co., Barrington, New Jersey.

FREE Catalogue! Thousands war surplus optical bargains. Lenses, Prisms, Telescopes, Binoculars, etc. Send \$1.00 for 10 Lens Hobbyist Set and Project booklet. G. Jaegers, 691 West Merrick Road, Lynbrook, New York.

BUILD your own Reflector Telescopes. Complete kits; Mirrors, Eyepieces, Tripods, all other accessories. Request free illustrated literature. Criterion Manufacturing, Dept. KP-62, Hartford, Conn.

AMAZING prices, precision binoculars. Folder "Binocular Selecting," catalog free. Dealers also write Prentiss Importers, Mercury Bldg., West Los Angeles 25, Calif.

TELESCOPES, mirrors, binoculars, microscopes, accessories. Free catalog. National Optical Company, 505 New York Avenue, Union City, New Jersey.

STARGAZERS! Exciting New Magazine! Sample 50c. Monthly Evening Sky Map, Box 213-PS, St. Louis 5, Missouri.

REFLECTING Telescope completely assembled. 60X. Guaranteed Observatory clearness. Free information. The Skyscope Co., P. O. Box 55, Brooklyn 28, New York.

BINOCULARS, Telescopes, Microscopes. Terrific values \$3.98 up. Request free money-saving catalog. Criterion, Dept. S-87, Hartford, Conn.

TELESCOPES—refractor, reflector, kits and accessories. Free illustrated booklet. Dell Optics Co., Limited, Dept. PS, 329—55th Street, West New York, New Jersey.

TELESCOPE Makers—Bypass polishing with "Nopol." Kit \$3.98, Folder 10c. Rte 1, Box 174E, Covington, La.

TELESCOPES, binoculars, microscopes—all sizes. Complete telescope kits, parts, accessories. Free illustrated catalog. Suffolk Science, Mattituck, New York.

REFLECTOR Telescope Kits direct from factory. From \$7.75. Other optical do-it-yourself kits. Free booklet. Hampton, P. O. Box 772, Sparta, New Jersey.

ASTRONOMICAL books, star-atlases, free list. Herbert Luft, 69-11 229th St., Flushing 64, N. Y.

## 15 SPORTING GOODS, GUNS, FISHING TACKLE, ARCHERY, TRAPPING

100,000 PRODUCTS Wholesale — Free catalog! Send postcard: Econ-O-Mart, Whippany 16, New Jersey.

FREE . . . Wholesale Catalog. Beads, Spinners, Lure parts. Sinkers molds. Jigs, Reels. Finny Sports, (PE), Toledo 6, Ohio.

10,000 GUNS!!! — Antiques, Moderns, Swords, Armour—every description. Giant Catalog \$1.00. Agramonte's, Yonkers 2-A, N. Y.

SAVE! Gun & Tackle 100 Page Discount Catalog. Unusual and famous brands. Send 25c to Klein's, Chicago 24.

HOW to catch fish with smell—Secret Formulas—New Recipes, \$1.00. Johnson's, 312-S Lake Avenue, Ithaca, New York.

6-SHOT Colt Revolver. 22 Cal. Short Ammunition. No blank. \$12.50, F.O.B. Chicago. Import Associates, Dep't. PS2, 185 N. Wabash, Chicago 1, Ill.

FINEST Revolver, Pistol Grips. Free Catalogue. Frielichs, 396 Broome Street, New York 13, N. Y.

CROSSBOWS! Hunting—Bows! Factory Prices! Jayco, Box 1355, Wichita, Kansas.

5000 GUNS, Swords, War Relics. Catalog 50c. Smith Museum, Runnemede, N. J.

JAP rifles altering American shells \$6.00. Jap shells \$3.95, catalog 10c. TP Shop, West Branch 10, Michigan.



# POPULAR SCIENCE OPPORTUNITIES

## 16 CAMPING EQUIPMENT & TENTS

**CAMPING** Equipment, world's largest selection. Low prices. Send 25c (print name-address) for 160 page complete catalogue of Tents, Camping Equipment, national camp sites guide & camping handbook. Morsan Tents, 10-15G 50th Ave., Long Island City 1, New York.

**ENJOY** Camping: Make big profits while you play, with Heilite Camping Trailer dealer franchise. Sets up into complete camp in just one minute; attracts crowds wherever shown! Write for dealer program. Heilite Trailers, 1506 South Sacramento, Lodi, California.

## 17 DOGS, BIRDS, HAMSTERS, RABBITS & PETS

**RAISE** Rabbits on \$500 month plan. Free details. White's Rabbitry, Mt. Vernon, Ohio.

**BREED** Red Squirrels \$10.00 each. Chipmunks \$6.00 each. Balch Squirrel Farm, Castleton, Vt.

**EARN** \$10,000 Yearly Raising Angora Rabbit Wool for us. Information 25c Coin. American Angora Company, Malta 1, Montana.

**RAISE** Rabbits—Most profitable way! Particulars free. Grinsteads, Edwardsville, Illinois.

## 18 LIVE BAIT

**MAKE** Money Raising Texas Redworms—\$200-\$300 Monthly Sparetime. Free folder. Complete Illustrated Book by Shields \$2.00. Maxwell, R2, Irving, Texas.

**\$1,000 MONTHLY** Possible, raising Earthworms—African Giants! Backyard, Garage, Basement. Complete Illustrated Booklet, explains raising, feeding, packing, marketing. Send 25c! Ozark Worm Farm-V, Willow Springs, Missouri.

**FREE** Literature. Big money raising fishworms and crickets. We teach you how to raise and sell. Special Today! Hybrid red wigglers. 3000—\$5.95. 5000—\$8.95. 10,000—\$16.95. Postpaid, with raising and marketing instructions. Carter Farm-12, Plains, Georgia.

## 19 FARMS, OTHER REAL ESTATE

**FLORIDA**—Nice homesites, \$345 at \$10 monthly. Folder Free. Winfree Vernor, DeLand, Florida.

**CENTRAL** Florida Developments. Trailer Homesites; also Lakefront and Highway Lots; Acreage. No interest. From \$295.00. Terms. Victor Roepke, DeLand, Florida.

**CANADIAN** Tax Sale Lands, average price five dollars an acre. Small monthly payments. Farms, timber, hunting and fishing camps, minerals. Limited number of properties. Write at once for free catalogue. Tax Sale Service, Room 113, 120 Bloor Street West, Toronto 5, Canada.

**FLORIDA** 2½-Acre Estates. Choice premium properties only \$995 at \$15 monthly. Douglas Wood, Fountain, Florida.

**NEW** Strout Spring Catalog Just Out! Free! Over 3400 Bargains described. 60 Years Service; World's Largest. Coast-to-Coast. Farms, Homes, Businesses. Strout Realty, 251-ZB 4th Ave., New York 10, N. Y.

**CANADIAN** Vacation Lands: Full price \$285.00, for 40 acres, \$10.00 month. Suitable cottage sites, hunting, fishing camps. Free information. Land Corporation, 130 Shaftesbury, Downsview, Ontario, Canada.

**FLORIDA** Lot Bargain! Only \$149 Full Price! (for limited time). No Money Down—\$5 per month. On US #441-27 between Ocala and Orlando. High and dry. Hard surface streets, electricity, phones, schools, churches. 3000 fishing lakes close by. Write for Free photos. Dept. 204, Orange Blossom Hills, Box 1222, Leesburg, Florida.

## 22 PROFITABLE OCCUPATIONS

**\$5000 FROM** Half Acre growing Ginseng, crop bought. Particulars 10c. Associated Growers, Sperling, Manitoba.

**FREE** Picture Folder, "How to Make \$3,000 Yearly, Sparetime, Backyard, Raising Earthworms!" Oakhaven-7, Cedar Hill, Texas.

**INVESTIGATE** Accidents—Earn \$125 week to start. Claim Investigators are urgently needed to investigate more than 490,000 accidents daily. Work full time for insurance company, railroad, steamship line, or government office. Or step into your own profitable spare time business. No experience needed. Free book—Now! Universal Schools, B-2, Box 8202, Dallas 5, Texas.

**BECOME** independent with your own franchise business. Thousands earning handsome incomes. Request interesting facts today. National Franchise Reports, PS-528, 333 North Michigan, Chicago 1.

**"VENDING** Machine Buyer's Guide". Lists 265 Sources; 54 Types. \$2. Penny Hill, Palestine, Texas.

**BE** a Technical Writer in industry or your own home. Send \$1.00 for Tech-Writers Guide, 4822 Iroquois Ave., San Diego 17, Calif.

**VENDING** Machines—No Selling. Operate A Route of Coin Machines and Earn Amazing Profits. 32-Page Catalog Free. Parkway Machine Corporation, Dept. 17, 715 Ensor Street, Baltimore 2, Maryland.

**FREE** Literature — Make Big Money Raising Fishworms and Crickets. Carter Farm-10, Plains, Ga.

**FREE** Book "990 Successful, Little-Known Businesses." Work home! Plymouth, 5T, Brooklyn 4, New York.

**ENJOY** Camping: Make big profits while you play, with Heilite Camping Trailer dealer franchise. Sets up into complete camp in just one minute; attracts crowds wherever shown! Write for dealer program. Heilite Trailers, 1507 South Sacramento, Lodi, California.

**LEARN** Piano tuning at home. Free information. American School Piano Tuning, Box 707, Gilroy, Calif.

**OPERATE** Collection Agency. "Gold Mine" opportunity. Lifetime business. Be respected. Franklin Credit, Roanoke, Virginia.

## 23 BOOKS & MAGAZINES

**GOOD** Used Books. 50c-\$1. Free Lists. Editions, Dept. PS, Hempstead, New York.

**"PROPHET** Elijah Coming Before Christ" Wonderful Book Free. 58 Megiddo Mission, Rochester 19, New York.

**BRITISH** Book Bargains. Any subjects. Catalogues free. Transbooks, Wantagh 77, New York.

**NEW-Used** Books Disposal: 12-\$1.10 Large New Books 4-\$2. Amazing Samples—Something Different—30c. Persil, 436 N.Y. Ave., Brooklyn 25, N. Y.

**WHAT'S** your interest? Reading programs recommended. No obligation. World Research, 130 Gillespie, Syracuse 9, N. Y.

**BOOKHUNTERS:** All Subjects. Send Wants! Jaher Book Service, 183 Hazelwood Drive, Westbury, New York.

**SELF** help books all subjects. Free catalog. Box 102-B, Providence, R. I.

**TRADE** in your books and pocket books at full price here! List free, all subjects, including science-fiction. Werewolf Bookshop, Verona 1, Pa.

**ATHEIST** Books. Catalogue free. Truth Seeker Co., 38 Park Row, New York 8.

**HANDLE** Subscriptions All Magazines Special Offers. Good Commissions. Cassell Agency, Boynton Beach, Florida.

**1,000,000** BOOKS—10c Each! Every subject! Catalogs, dime! Mailway, Box 124-PS, Stuyvesant, NYC-9.

**100,000** 10c-BOOKS! Amazing subjects! Three catalogs, (Books-Bargains), 25c. refundable. "Bargains," 1323-MD Chaparral, Corpus Christi, Texas.

**UNIQUE,** revealing books! Two catalogues, dime. Brown, 61 Haven, New York 32.

**BOOKS:** Over 5000 titles catalogue 25c. R. Plumb, Herkimer, N. Y.

## 24 HYPNOTISM

**HYPNOTIZE** Self Others while asleep with amazing hypnotic phonograph records, tapes. Catalog free. Research Association, Box 24-G, Olympia, Washington.

**FREE** Illustrated Hypnotism. Selfhypnosis Catalogue. Write: Hypnotist, 8721 Sunset, Hollywood 46P, California.

**FREE** Catalog! Hypnotism, Autohypnosis! Books, Tapes, Records! Drawer PS697, Ruidoso, New Mexico.

**INVENTION,** plastic Hypno-Coin has whirling hypnotic lens. Complete with secrets, instructions, only 99c. Success or Money Back. Free catalog—records, books, machines, enclosed. Hypnotic-Aids, 2-PS, 1133 Broadway, New York City 10.

**HYPNOTIZE** Successfully! "One Word." "Instantaneous." "Against Will" Methods Exposed! Complete Illustrated Course—Including "Secret Nerve Pressure Technique" \$1.00. Arthur Fowler, 608 Broad, Woodbury, New Jersey.

**XRAY** Mind! Hypnotize, one glance. Guaranteed \$3.00. Wamsteker, Box 10, Ottery, Cape, South Africa.

**"HYPNOTIZE** . . . One word . . . One fingersnap." on stage. Satisfaction—or refund. \$2. Hypnomaster, Box 9309-S6, Chicago 90.

**HYPNOTIZE** unnoticed, quickly-effortlessly or refund! \$1.00. Minter, Box 244-P, Cedarburg, Wisconsin.

**A Good Match** Hypnosis & E.S.P. \$1.50. Mr. Pressnall, Box 561, Whittier, Calif.

**AT Last!** New book really teaches how to achieve self-hypnosis, how to use it. Free literature. McKinley Publishers, Dept. 2, Box 3035, San Bernardino, Calif.

**SCIENTIFIC** Hypnosis: Imer, P. O. Box 681, Garden Grove, California.

**OVERPOWERING** hypnotic device, fits phonograph. 50c. Ziff, 2260 Burnett, Brooklyn 29.

**"HYPNOTISM** Explained". 64 page book—15c. Bookmaster, 2251 Derby, Berkeley 5, California.

## 24A JOKES, GAMES, NOVELTIES, ETC.

**ONE** Thousand Tricks, Jokes, Stunts, Magic, Illusions, Puzzles! Jumbo Catalog (160 pages) Rush 25c! Free Trick Given! House of 1000 Mysteries, 202-39 Pinewood, Trumbull, Conn.

**3100** NOVELTIES. Jokes, tricks, gadgets, funmakers, hobbies. Big catalog 10c. Johnson-Smith, D-497, Detroit 7.

**VX** Parachutist—Terrific flying toy—Direct from Germany. Just \$2.45. Dobis Distributors, Falls Creek, Pa.

## 25 MAGIC TRICKS, PUZZLES, ETC.

**HEY** Fellows! Don't miss the Fun! Get the World's Greatest Magic & Fun Catalog ever published! Famous the world over! 160 exciting pages of Magic, Jokes, Tricks, Mysteries! 1000 ways to Be the Life of the Party! Rush 25c today! Free Trick Given! House of 1000 Mysteries, 202-38 Pinewood, Trumbull, Conn.

**WORLD'S** finest professional magic Joker novelties. Giant illustrated catalog 10c. Top Hat, Evanston 13, Illinois.

**WIN.** Dice, Cards, Catalog 10c. Book, Box 671, St. Louis 1, Missouri.

**500** TRICKS, Douglas famous 120-page catalog now available just 10c. Fastest service to magicians everywhere with latest in magic for parlor, stage, pocket. Send 10c today. Douglas Magicland, Dept. 12, Dallas, Texas.

**MAGIC** catalogue 25c. Eagle magic, 713 South Third Avenue, Minneapolis 2, Minnesota.

**3000** TRICKS, pocket, parlor, stage. World's Finest Magic Catalog (408 pages). \$2.50. Kanter's, S-1311 Walnut, Philadelphia 7.

## 26 COINS & CURRENCY

**\$4,000.00** for 1913 Liberty Head Nickel. Uncirculated Dollars 1804-1839, 1893-S, 1895-P, 1903-O pay \$100.00-\$5,000.00. Certain Dates—Lincoln Cents before 1932—\$125.00; Flying Eagle Cents—\$500.00; Indian Cents—\$175.00; Dimes before 1943—\$2,000.00; Quarters before 1924—\$1,500.00; Half Dollars before 1929—\$3,000.00; 2c Pieces—\$125.00; 3c Pieces—\$150.00; Half-dimes—\$1,500.00. Hundreds of others worth \$10.00-\$1,000.00. Canadian Coins—1921—5c Silver—\$100.00. 1875 Quarters—\$100.00. 1921—50c—\$750.00. Wanted—20c Pieces, Gold Coins, Paper Money, etc. Our Large Illustrated Guarantee Buying-Selling Catalogue. Giving Complete Allcoin Information—send \$1.00. Purchase Catalogue before sending coins. Worthycoin Corporation (K-408-C), Boston 8, Massachusetts.



# POPULAR SCIENCE OPPORTUNITIES

**OLD Money Wanted.** Will pay \$1,000.00 for 1894 Dime, S. Mint. \$5,000.00 for 1913 Liberty head nickel (not Buffalo). Big premiums paid for all rare coins. Send 5c for Large Coin Folder. May mean much profit to you. Numismatic Co., Box 750-R, Costa Mesa, California.

**COINS** from Formosa, Vatican, etc., plus foreign banknote, 10c with coin approvals. Littleton Coin Company, Littleton S2, New Hampshire.

**FREE Bargain Coin List** Send Stamped Envelope. Hobby Sales, Box 4054, St. Paul 16, Minnesota.

**WOWIE!** Indian Cent, Foreign Coin, Bargain Lists 10c. Hutchinson's, Box 4747, Philadelphia 34, Penna.

**OLD U.S. Coins—Large Cent—2c piece—3c piece—half-dime—\$1.00 each.** All four with catalog \$3.50. Coin Care Corp., 1627 West Anaheim, Long Beach 13, Calif.

**FREE List!** U.S. Coins. Lowest Prices. Hugh's Coins, Hickory, North Carolina.

**FREE Bonus Offer!** U.S. Bargain List, 10c (refundable). Economy Sales Company, Mansfield, Massachusetts.

**COIN Magazine,** 200 pages. Sample 40c. Numismatic, 7320 Milwaukee, Chicago 31.

**TEN Different Indianhead cents \$1.00.** Bargain lists Free. Sayers, 1000 Unaka, Johnson City, Tenn.

**EIGHT Different Indian Cents \$1.00.** Collector's Bargains, Box 356A, New Hope, Penna.

**LINCOLN Cents 1923-S, 1924-S, 1921-S, 1916-S, 1918-S, 1917-S, 1927-S, 1920-S, 1925-S, 1928-S, 1932-D, 1934-D Lot \$3.00.** Berry, Box 306, Westminster, Calif.

**LARGE Cent \$1.00 Price List 10c.** R & M Coins, Delanco, New Jersey.

**POCKET change worth a fortune?** Send \$1 for illustrated U.S. coin catalogue that lists high prices. We pay! Centre Coin Co., 5A Centre St., Hempstead, N. Y.

**U.S. coin list 10c** Contains over 100 illustrations; over 5,000 delightful bargains. Stoney, 260 Washington, Boston 8, Mass.

**RAREST CC Mint Dollar, 1885 Unc.** \$7.50. 100 Pg. Illustrated Catalogue 50c. Shultz, Salt Lake City 10, Utah.

**NUMISMATIC'S Largest Newspaper.** Semi-Monthly. Sample 25c. \$2.00 Yearly. Numismatic News, Washington Street, Iola, Wisconsin.

**THREE Brilliant uncirculated Mexican Silver Dollars, \$1.00.** Universal Services, Box 675, San Antonio 6-A2, Texas.

**40 GENUINE Foreign Bills—\$1.00.** Musser, Box 505-A, Dunbar, West Virginia.

**FANTASTIC Coin Bargains!** Free List. Jeff's, Box 105, Newton, North Carolina.

**WE purchase Indianhead pennies.** Complete allcoin catalogue 25c. Magnacoin, Box 61-BR, Whitestone 57, New York.

**WE buy all rare American coins.** Complete catalogue 25c. Fairview, Box 1116-YH, New York City 8.

**SIXTEEN page 1960 retail price list** of U.S.A. and Canadian coins for 10c. Our selling prices on thousands of coins and coin collectors supplies. Bryson Incorporated, 612B White, Toledo 5, Ohio.

**GET Profit And Pleasure in collecting old coins.** Send 20c for 68-page illustrated coin catalog. You'll be delighted with it. Send for it now. B. Max Mehl, Box 750-C, Costa Mesa, Calif. Oldest rare coin establishment in U.S. Established 50 years.

**BRILLIANT Proof sets—1954 \$7.75; 1955 \$6.75; 1956 \$4.75; 1957 \$3.50; 1958 \$7.00; 1959 \$3.50.** World coin Book \$4.00; Retail Guidebook \$1.75. Canadian \$1.50. World's Greatest Bargain Catalogue \$1.00 (Deductible first \$10.00 order). Bebee's, 4514 North 30th, Omaha 11, Nebraska.

## 27 OLD STAMPS WANTED

**I Will Pay \$100.00 each** for 1924 1c green Franklin stamps rotarypress perforated eleven (up to \$1000.00 each unused). Send 20c for Large Illustrated folders showing Amazing prices paid for old stamps and coins. Baker-Stamps (203-PS-20), Oradell, New Jersey.

## 28 STAMP COLLECTING

**UNITED States commemorative collection** containing 33 different—10c. Approvals. White, 516-W Avenue L, Brooklyn 30, New York.

**225 STAMPS** For only 10c! This mammoth value includes Airmails, Pictorials; stamps from strange Countries cataloguing up to 25c each! Also Approvals. Mystic Stamp Company, Camden 55, N. Y.

**307 WORLDWIDE** different stamps only 25c. Approvals. Niagastamp, St. Catharines 672, Ontario.

**WOW! 110 All Different Germany 10c** Zeppelins, Semi-Postals, Airmails. High values, etc. Giant Catalog, bargain lists included with beautiful approvals. Jamestown Stamp, Dept. A20PS, Jamestown, N. Y.

**AMAZING Offer!** 200 U.S. stamps—including commemoratives, airmails, high denominations to \$1.00—only 10c to Approval Applicants!! Illustrated Bargain Lists free. Mystic Stamp Co., Dept. 55, Camden, New York.

**103 DIVERSIFIED** British Colony Stamps only 10c. Approvals. Niagastamp, St. Catharines 672-A, Ontario.

**ALBUM only 10c!** Hundreds of spaces! Stampmart Company, Hartford 1, Connecticut.

**102 DIVERSIFIED** Worldwide stamps 10c. Approvals. Linstamp, St. Catharines 619, Ontario.

**25 DIFFERENT large American Commemoratives 10c.** With approvals. Linstamp, St. Catharines 619-A, Ontario.

**NUDES set (4)—Unusual Approvals 10c.** Atlas, Eisenhower, Racine, Wisconsin.

**FREE! Giant Bargain Catalog—New** Edition listing thousands of bargains including U.S. and B.N.A. stamps, packets, mixtures, albums, accessories and supplies; sent with beautiful approvals. Jamestown Stamps, Dept. E20PS, Jamestown, N. Y.

**1000 DIFFERENT** Worldwide Stamps \$1.00. Valued over \$20.00. Universal, Box 6, Kenosha 6, Wisconsin.

**INTERESTING** Worldwide Animal stamp collection 10c. With approvals. Niagastamp, St. Catharines 672-B, Ontario.

**WORLDWIDE, 50 all different,** absolutely free, just to introduce our incomparable approvals. Kent Stamp Company, GPO Box 87, Brooklyn, New York.

**100 DIFFERENT** Stamps, 10c with approvals. Smith, 508U Brooks, College Station, Texas.

**EXCEPTIONAL 125 different,** cataloging \$3.00, includes triangles, commemoratives, 10c, approvals. Reeves, Box 37597P, Miami 37, Florida.

**FREE! Liberia Airmail Triangle, Diamond, Midget, Mammoth** to approval buyers. Plymouth, Dept. A-2, Bell, California.

**100 DIFFERENT Belgium Free. UPU.** Brussels Fair, Railroad Stamps Free. Approval applicants only. Trylon, Box 31-S, Brooklyn 30, N. Y.

**FROM fabulous Las Vegas** comes the most unique system of building real value collections ever devised. The one sure way of filling those blank spaces in your album. This system puts your duplicates to work for you and gives you what you want. \$1.00 for one full year's membership. The Whitehouse, 558 Oakley Blvd., Las Vegas, Nevada.

**FINE U.S. Stamps, \$5.00 Coolidge** of the 1938 Presidential series, and the \$5.00 Hamilton of the 1954 series. Both for only \$1.00. Fine U.S. Approvals included. Willett Co., P. O. Box 338, Dept. 44, Yorktown Heights, N. Y.

**FREE! \$1.00 worth, your choice,** from first selection. No Strings! Adults Only. Rush request now. Philatelics, Dept. TF, New Paltz, New York.

**508 DIFFERENT** Worldwide from Madagascar, Macao, Guinea, etc., cataloguing over \$15 only 35c. Offer open to adults only. Approvals. Littleton Stamp Company, Littleton Q2, New Hampshire.

**150 DIFFERENT** United States Stamps, Fabulous value only \$1.00. Free United States price list. Universal, Box 6, Kenosha 6-B, Wisconsin.

**QUEEN Elizabeth On Stamps . . . A** beautiful collection of 50 different stamps from 22 countries—all bearing the portrait of the Queen of England, 10c with approvals. Capital Stamp Co., Ferrysburg 10A, Mich.

**SURPRISE** Collection exotic mint British Colonials absolutely free with approvals. Viking, Great Neck 5, N. Y.

**TERRIFIC Stamp Bargain!** Israel—Iceland—Vatican Assortment—plus exotic triangle set—Also fabulous British Colonial Accumulation—Plus large stamp book—all four offers free—Send 10c to cover postage. Empire Stamp Corp., Dept. PR, Toronto, Canada.

**FREE!! Franklin Roosevelt Giant Triangle.** 25 others Different. Approvals. Berchtold, RFD #1, Troy, Ohio.

**GIANT-Size Issues Collection:** Laos Elephant Set, Brussels Fair, Olympic, Jet Aircraft, Boy Scout, Somali Animals complete. Romania Flags. Togo set, Diamond Popes, UN set, etc., plus big Stamp Dictionary and Approvals. Everything 10c! Stampex, Box 47-KP, White Plains, N. Y.

**125 DIFFERENT U.S. Fine Collection.** Large commems, airs, etc. Only \$1.00. Schenkel, 413 Evans, Willow Grove, Pa.

**LIQUIDATING** Collections. 2c approvals. Job lots. Moredan X424, Boston 81, Mass.

**FREE!! Miniature sheet.** List material desired on approval. Mizdrak, Chicago 22.

**FREE Sample!** Interesting, Informative, Illustrated. National Stamp News, Anderson, South Carolina.

**TWO \$5.00 United States Stamps,** twenty others 10c with United States approvals. Irwin, Box 1109, Brooklyn 30.

**WORLDWIDE Stamp Exchange.** Details free. Isl. Box 3374, Sheungwan, Hong Kong.

**SUPERIOR** worldwide mission mixture. Amazing variety! Six ounces \$1.65. Pound \$3.95. Bay Nielsen, 4545A Harvard, Montreal 28, Canada.

**FREE Collections—Canada, Philippines,** World Wide, many others—each over \$5.00 value. Many other attractive premiums Free with purchase of sensational foreign approvals. Topval, Box 486C, Redlands, Calif.

**U.S. Stamps, Giant Discount Catalog—** 20c. Raymax, 37-VX Malden Lane, NYC 38.

**105 DIFFERENT U.S. stamps 25c,** Approvals included. Shelron, Box 907, New York 8, N. Y.

**MYSTERY packet? 30c.** No approvals. Francis, 562 San Jose, San Francisco 10.

**YEMEN UPU Mint Set Free** with Approvals. W-B Stamps, Wilkes-Barre, Pa.

**PENNY Approvals jammed** with Bargains. For better values, try Putnam Stamp Company, Mahopac, New York.

**89,000 STAMPS Sale.** Bargain Lots: 31c—\$1-\$2. High Value Packet \$3. Extra Special Giant Assortments \$5. Persile, 436 N.Y. Ave., Brooklyn 25, N. Y.

**ZOUNDS! Amazing "Strange Countries"** packet. Free with approvals! Saxon, Orange, California.

**10 POUNDS U.S.A. Mixture—\$3.75** plus postage. Utechts, 1143A North Keeler, Chicago 51.

**60 DIFFERENT U.S. (30 Commemoratives)** 25c. No approvals. Seidenberg, Appleton, Wisc.

**100 FOREIGN, 20 U.S. Commemoratives, 10c.** Approvals. Weckerling, 806B Orange, Weslaco, Texas.

**20 BRITISH Pictorials 10c Approvals.** Van, Box 981, Columbus, Mississippi.

**SURPRISE World Packet.** Free With Approvals. Wirth, Route 6, Norwich, Conn.

**15 MULTICOLORS** from Life Magazine! 10c. Approvals. McDonald, 3113 E. Maraposa, Phoenix, Arizona.

**FREE!! Foreign Stamps Price List.** Wholesale prices. Revere, Box 28, Arlington Heights 75, Massachusetts.

**CANADA: Totem dollar and Seaway** only 25c, approvals. Rheume, 6591 11th Ave., Montreal, Canada.

**FREE—any volume** Scott's International Albums, Scott's 1960 Catalogues, even Master Global Albums Free When You Buy Our Sensational Foreign Approvals. Bargain Stamps, Redlands 3, California.



# POPULAR SCIENCE OPPORTUNITIES

**DEALERS Wholesale Catalog.** Postage 4c. Franksco, 5031 Queensbury, Baltimore 15, Maryland.

**GIANT Approvals Thousands Different** 1c and 2c each. Wahl's Stamp Exchange, 7008K Farragut, Chicago 31, Ill.

**GIVEAWAY!** Boy Scout First Day Cover only 10c. Loral Stamps, Box 22-P, Cambria Heights 11, New York.

**50 DIFFERENT stamps free!** Approvals. Marford, Box 48, Queens Village 29, New York.

**100 OLD U.S. Stamps** between 1861 and 1935 \$1.00. Rousch Stamps, 51 Chestnut, Mansfield, Ohio.

**COMMEMORATIVES—Pictorials** mostly 1 to 3 cents in envelopes. Schnobelen, Columbiana, Ohio.

**FREE U.S. price list** plus foreign packet list. Thom, 4808 15th Avenue, Minneapolis 17, Minnesota.

**FREE Mint Set!** Approvals accompany. Mintco, 5151 Princeton, Memphis 17, Tennessee.

**U.S. Mint Flag set, complete.** \$1.00. Free list. Brooks, 2323-T Avenue X, Brooklyn 35, New York.

**FREE "Surprise" packet** with pictorial approvals. Dancer, B75-T4, Mansfield, Ohio.

**ECONOMICAL 1/2-3c Approvals.** 33,000 varieties. Dresel, Box 128-T, West Englewood, New Jersey.

**AIRMAILS:** World wide selection. Plus complete sets from Europe and North America. All for one dime with approvals. Charles Boger, Box 152, North Wales, Penna.

**115 UNUSUAL** including \$1 U.S. Sputnik, Jets, Helicopter triangle, Pope diamond, Ghana, Israel, U.A.R., Vatican. Colorful stamps pictured in Life. 10c with approvals. Rosen, 238S 8 Ave., Paterson 4, N. J.

**200 MIXED U.S. Including Large Commemoratives.** Dime. Monjar, Cincinnati 14, Ohio.

**TRADE your duplicates** toward our approvals! (Foreign only.) Complete information, 10c. Variety Stamps, Box 98-S, Newton Highlands 61, Massachusetts.

**1500 STAMPS \$1.00** On and off paper. Good variety. World wide. Many pictorials. No approvals follow. Satisfaction guaranteed. Whalen, 1435 First Ave., Oakland 6, Calif.

**FREE! 25 Egypt 5c handling.** Approvals. Bellet Stamps, Hazel Park, Michigan.

**U.S. List free.** Big discounts. National, Box 60, Boston 1, Mass.

**10 BEAUTIFUL Mint British Colonies** 10c with approvals. Bennett, Candor 2, N. Y.

**TERRIFIC Triangles!!!** Sports, Volcanoes, Mushrooms, African Flowers, Flags, Angola Map, 26 others 4c to approval buyers. Potomac Stamps, Washington 15, D.C.

**25 DIFFERENT Russia 5c** to applicants for our bargain approvals. Somith Stamp Co., Box 83-RS (Rugby), Brooklyn 3, New York.

**ITALIAN 1959 used olympic games set** complete 20c to new approval customers. James Vance, Box 342S, Newark, Ohio.

**POUND Unpicked Mission mixtures—** U.S. \$1.00, Canadian \$2.00. Mission, 220 W. Allerton, Milwaukee, Wisconsin.

**JULES Verne Commemoratives (3)** 15c. No approvals. Beck, 202 Franklin, Auburn, N. Y.

**UNITED States 100 different commemoratives** \$1.00, with foreign approvals. Jacobsen, Crompond, New York.

**FREE 80 page illustrated U.S. price list.** Enclose 10c postage. Finney, Box 89, El Monte, Calif.

**FREE! China Collection.** Approvals. Send 10c Postage. Coast, P. O. 2187SB, Santa Ana, California.

**25 DIFFERENT Commemoratives 1893** up 10c. U. S. Approvals. K & B, Box 70, Brooklyn 23, N. Y.

**MYSTERY Bag Stamp Collection.** Only 10c. Hill Company, Box 51, Defiance, Ohio.

**OLD scarce U. S. seconds** on approval. Slightly defective, bargain prices. Hearnfeld, Clintonhill Station, Newark 8, N. J.

**ADULTS! Like Stamps?** Then start your own Mail-Order Business. Our Free Guidance Program shows you exactly what to do, makes it Easy, Profitable for You. Details Free! Columbia, 9268-SP Piney Branch Road, Silver Spring, Maryland.

**LIBERIA Bicolored sports.** Free! Exciting, interesting, inexpensive approvals. Leebar, Box 134, Maspeth 78, N. Y.

**PENNY Approvals!** Regardless Catalogue! Kloster, 4164—52nd Ct., San Diego 5, California.

**\$1.00—100 STAMPS** each worth 1c to 8c with approvals. Cedar, 1009 E. LaSalle, Barron, Wisc.

**GERMANY Mint set** sixteen 10c. Approvals. John Schuster, 301 Sandpiper, Playa Del Rey, Calif.

**500 DIFFERENT Hungary.** Valued over \$10.00. Only \$1.00 with Unique Approvals. Universal, Box 6, Kenosha 6-C, Wisconsin.

**BIG U.S. Price List Free!** Bailey, 45-H Bromfield, Boston, Mass.

**14,000 DIFFERENT!** Amazing new plan builds your collection systematically, country by country. Only 50c weekly. Free details. L. G. Ware, Stepney 70, Conn.

**BARGAIN U.S., 100 different 25c.** with U.S. approvals. Stamps, Kennebunk, Maine.

**OLD U.S., Flags, Presidents, Commemoratives** with approvals, free gift 10c handling. Metropolitan Stamps, Box 312CZ, Jackson Heights, New York.

**TERRIFIC Value.** Eight Complete Mint Sets 10c With Approvals. Beatles, 58 Glenagar, Islington, Ontario, Canada.

**1000 FINE Mixed U.S. Stamps 25c.** Wright's, Box 1122, Hagerstown, Maryland.

**FOUR sets free** with low priced approvals. Byrd, 343 E. Sharpnack, Philadelphia 19, Penna.

**OLD U.S.; Foreign Pictorials Free** With Approval Purchases. Stamp Farm, S1-19, Oxford, Wisc.

**JUNGLE and Space Age.** Fascinating Wildlife selection and Original Sputnik stamp all free with terrific approvals. 5c handling. Stamp Imports, Peterboro, Ontario.

**SURPRISE set, fifty British Commonwealth.** Free with terrific approvals. Kawartha Stamps, Box 513, Peterboro, Canada.

**HUGE Stock United States, Canada.** British Colonies' Quality Approval collections. Enclose 10c. Peterson, Box 31, St. Paul 2, Minn.

## 29 ANTIQUES, RELICS & INDIAN GOODS

**ILLINOIS:—Selling hundreds—Confederate, Civilwar, Indian War, Western Muskets, Kentuckies, Springfield, Rifles, Pistols, Flasks, Blunderbusses, Flintlocks, Frontiers, Dueling, Pepperboxes, Matchlock, Confederate-Union Swords, Bayonets, Bullet Molds—12,000 Collectors cartridges — \$20,000.00 Confederate bills. — Gold Coins, Indian Cents,—Agates, Minerals, Fossils,—50,000 Stonegate Indian Relics, Arrowheads, Spearpoints, Discoidals, Gold Nuggets, Stagecoach Guns, Mounted Birds, Daguerrotypes, Holsters, Military Insignias . . . Send 35c (refundable) for large Listing. Heike's Bannerville, Wenona, Ill.**

**SELLING 100,000 ancient Arrowheads.** Spearheads. Tomahawks, etc. List free. Lear's, Glenwood, Arkansas.

## 30 MINERALS & PRECIOUS STONES

**"GEMS & Minerals Magazine,"** largest rock hobby monthly. Field trips, "how" articles, pictures, ads. \$3.00 year. Sample 25c. Box 687S, Mentone, California.

**GET Free Catalog** no serious rockhound, gem cutter, jewelry maker, hobbyist or Craftsman can be without. Full of bargains, exclusive items, low prices from largest suppliers and authorities in the field. Free . . . new catalog just off the press—yours for the asking! Write Grieger's, Dept. C-14, 1633 E. Walnut, Pasadena, California.

**TWELVE New Mexico Minerals \$2.00.** Six Fluoroscents \$1.06. Five Crystallized Minerals \$1.06. Fools Gold 35c. Hartson, Winston 5, N. Mex.

**"TREASURE Map of Mojave Desert,"** gems, minerals, recreation. 21x33". \$1.00 postpaid. Gemac, 808S, Mentone, California.

**PROSPECTORS!** Learn from experienced geologists, how to locate and identify rocks and minerals. A comprehensive home study course designed for anyone interested in exploring for valuable ore deposits. Write Now, for free literature. Pacific School of Mines, Dept. CC, Box 2538, Palm Springs, California.

**EARTH Science — Rockhounds National Magazine.** Subscription \$2.00. Sample 35c. Box 1357-PS, Chicago (90), Ill.

**18 COLORFUL** and basic U.S. mineral specimens attractively boxed with descriptive folder \$1.90 prepaid. Included free dinosaur bone pocket piece. Rock Haven Mineral Co., Dept. 101, Whitefield, N. H.

**BEAUTIFULLY Cut Australian Fire Opal \$2.00.** Rough \$2.00 Ounce. Free List. Western Gems, 2038S Stanton, Castro Valley, California.

**FREE bargain gem list.** Lapidary and silversmith catalog, 56 pages, 25c. O'Brien's, 1116 N. Wilcox, Hollywood 38, Calif.

**GOLD, Silver, Copper Ore** With Catalog 50c. Gemco, Elsner Ave., Sheboygan, Wisc.

## 31 HOBBIES, COLLECTIONS

**INVENTING** can be an interesting and profitable hobby. Write for complete particulars. Institute of American Inventors, Dept. 30-E, 635-F St., N.W., Washington 4, D. C.

**COLLECT Foreign Medals.** Daggers, Helmets, Iron Cross with ribbon, \$1.50; Catalog 25c. Hobbies, Box 71-A, Rockaway 94, N. Y.

**FREE Sea Horse 100 Assorted shells** \$1.00 Postpaid. Varble's, Harlingen, Texas.

**COLLECTORS Matchbook covers.** 100 Different unused \$1.00. Catalog 25c. Album \$3.00. Charles Edelman, 1311-P East 84, Cleveland 3, Ohio.

## 32 PHOTO FINISHING, PHOTOCOPIES, ETC.

**A Triple Value—Quality, Price, Service.** Color or Black & White. 12 exp. (Black & White)—59c. 20 Gift Photos—\$1.00. Holiday Photos, Dept. 17, Box 666, Denver, Colo.

**A 3-in-1 Value—Price, Quality, Service.** 20 Gift Photos—\$1.00. 12 exposure rolls (Black & White)—59c. Color or Black & White. Interstate Photos, Dept. 12, Box 15, Aurora, Ill.

**TWELVE Exposure rolls 49c.** Wallets 20 for \$1.00. Lincoln Studios, Dept. L, Box 13, Lincoln, Nebr.

**FREE! Kodak Film For Life.** New Kodak Film for every roll you send to develop. Jumbo size. Black and White: 8 Exp. 80c—12 Exp. \$1.05. Kodacolor: 8 Exp. \$3.50—12 Exp. \$4.50. Send for price catalog for more savings. Satisfaction Guaranteed. Yankee Photo Service, Box 1820-PS, Bridgeport 1, Conn.

**OIL Coloring Photographs—A fascinating hobby** or profitable sideline for those with artistic talent. Learn at home. Easy simplified method. Free booklet. National Photo Coloring School, 835 Diversey Parkway, Dept. 1722, Chicago 14.

**ENLARGEMENTS!** Eight 5x7's or Five 8x10's from negatives, \$1.00. Wilart, Box 975, Little Rock, Ark.

**MOST beautifully colored 8x10 enlargement.** Send favorite photo, \$1.00 fully guaranteed. Dick's Studio, Louisville 12, Ky.

**ROLL Developed 4X6 or 4X4 prints.** 8 exposure 50c; 12, 70c. 5x7 prints; 8 \$1.00; 12, \$1.40. Hagner, 1318 West Columbia, Philadelphia 22, Pennsylvania.

## 32A COLOR PHOTO FINISHING

**PROFESSIONAL Quality Kodachrome, Ektachrome.** Movie processing \$1.25. Request Mailers. National Color Corporation, Atlanta 24, Ga.



# POPULAR SCIENCE OPPORTUNITIES

## 33 MOTION PICTURES, SLIDES SOUND EQUIPMENT

**FREE:** Blackhawk's big sale catalog 8mm, 16mm, movies, 2"x2" color slides. Biggest selection anywhere! Projectors, cameras, supplies—big discounts! Get free, every three weeks, 12-page newspaper size bargain list! Blackhawk Films, Davenport 15, Iowa.

**MOVIE** Camera Film 8 mm roll \$1.50. 16mm 100' \$3.00. Free processing. Better Films, 742 New Lots, Brooklyn, N. Y.

**MOVIE** Film! Free catalog! Eso-H, 47th Holly, Kansas City 12, Mo.

**10c BRINGS** big new Cine Manual for the 8mm-16mm Movie Maker. Save \$\$\$ on fresh B&W and Color Movie Film, all Home Processing Equipment. Superior, 442-448 N. Wells, Chicago 10.

**16MM** Sound shorts. Tremendous assortment of features. \$16.50 up. Used 16MM sound projectors, \$79.50 up. Catalog. Abbe Films, 417 West 44th Street, New York 36, PLaza 7-2219.

**HI-FI** Recorders, Free Wholesale Catalogue. Carston, 125-PS East 88, New York City 28.

**FREE** Bargain Bulletin of 8mm, 16mm silent and sound films (specify size) from Castle, Official, Looney Tunes, etc. New and used shorts and features. World's largest selection at discount prices. Peerless Camera Stores, 415 Lexington Ave., New York. Dept. 18S.

**TAPE** recorders, Hi-Fi components. Sleep Learning Equipment, tapes. Unusual values. Free Catalog. Dressner, 69-02 174 Street, Flushing 65, New York.

**16MM** Sound Films Also 8MM Films. Bedner, 5300 So. Talman, Chicago 32.

**FREE** Catalogues. 5,000 8-16MM Films. International Films, Greenvale, New York.

**16MM** Sound Films. Bargain Bulletin. Duquette, 97-R Snow, Fitchburg, Mass.

**SPECIAL** Entertainment—8 mm. b&w, 50 feet \$12.00. 16 mm., b&w, 100 feet \$20.00. Tex, Box 368, Terminal A, Toronto, Canada.

**UNUSUAL** Budget Values. Tape recorders, tapes and hi-fi components. Send for package quotations and free catalogue. Budget Hi-Fi Distributors, 83-06 Vletoer Ave., Elmhurst, N. Y.

## 34 CAMERAS, PHOTO SUPPLIES

**PHOTOGRAPHY** for pleasure or profit. Learn at home. Practical basic training. Long established school. Free booklet. American School of Photography, 835 Diversey Parkway, Dept. 1722, Chicago 14.

**164 PAGE** Photographic Bargain Catalog, listing thousands of photographic bargains. Send 25c for your copy, credited on first order. Dept. 4-C2, Central Camera Company, 230 So. Wabash Ave., Chicago 4, Illinois.

## 35 MUSICAL INSTRUMENTS, SONG WRITERS & RECORDS

**SONGPOEMS** and lyrics wanted. Mail to: TinPan Alley, Inc., 1650 Broadway, New York 19, N. Y.

**SONGWRITERS:** Recording Company Wants new songs. Royalty basis. National sales, promotion if selected. No charge for melodies. Send material. Music Makers, Dept. G 56, 8344 Melrose, Hollywood, California.

**SONGWRITERS!** Protect your ideas! Hold all poems, songs! Write for safe, correct procedure! Song Service, Dept. PS, 333 W. 56th, New York 19.

**POEMS** Wanted for musical setting and recording. Send poems. Free examination. Crown Music Company, 49-P West 32 Street, New York 1.

**ACCORDIONS**—1960 Models. Lowest discount prices. Save up to 50%. Free home trial. Trades accepted. Big color catalog free. Accordion Manufacturers, Dept. 20-P, 2008 Chicago, Chicago 22.

**SONGS** Into \$\$\$\$\$\$—Share \$33 million dollars yearly for New Songwriters. Song-poets. Any subject, songs composed, published, promoted by largest firm. Information, appraisal Free. Send Nurdyke Music Publishers, 6000 Sunset, Hollywood 28PS, California.

**PARTY** Records. Sample record and catalog \$1.00 postpaid. Hollywood Jokers, Dept. 7, 1624 North El Centro, Hollywood, California.

**POEMS** Needed Immediately for New Songs and Records. Free Examination and Appraisal. Send Poems: Songcrafters, Acklen Station, Nashville, Tenn.

**PROFESSIONAL** service for amateur songwriters. Colonna Enterprises, Box 888, Burbank, Calif.

**SONGWRITERS**, with publisher contacts, want song ideas. Share royalties. No fees. Send poems: Songwriters' Associates, 1650 Broadway, New York 19-F.

**POEMS** Wanted for musical setting and recording by America's Largest Song Studio. Send poems. Free examination. Five Star Music Masters, 646 Beacon Building, Boston.

**GUITAR** for beginners—easy! Quality professional Guitar, plus famous "Play-at-once" course—case—music stand. Easy time payments. Free details. Sale, Bradley Beach 10, N. J.

**12 LATEST** Top Tunes On 45 R.P.M. Records \$1.98 Postpaid. Records, P. O. Box 1382, Joliet, Ill.

**GUITAR** Making, books, plans, imported woods, tools. List 10c. Wildwood, 510 East 11th Street, New York 9, N. Y.

**POEMS** Wanted! Best songs recorded Free with 7-piece orchestra. Melodies written. Songmakers, 1472-S Broadway, New York 36.

**RECORDS**, Stereo, Monaural, Big Discounts. Write Noelsson, Box 211, New York 5, N. Y.

**SONGWRITERS**—Arranging by Specialists. Music set to poems, religious and popular. Offset printing. Free information. Music Printing Company, Dept. PS-2, 732 South Sherman, Chicago 5, Ill.

**PUBLISHER** wants songs. Royalty basis. N. Y. Music Publishing Co., 15 Park Row, N. Y. C.

**ELECTRIC** Guitars, amplifiers, wholesale. Free catalog. Carvin, PSM, Covina, California.

**PHONOGRAPH** Records cheap, postpaid. Catalogue. Paramount, Box 2026-S, Pine Castle, Florida.

## 36 RADIO, TELEVISION, SUPPLIES & EQUIPMENT

**RADIO & TV** Tubes at Manufacturers Prices! 100% Guaranteed! Brand New! No re-brands or pulls! United Radio, Box 1000, Newark, New Jersey.

**FIX** Your Own TV. Save 80%! Send for Free Illustrated Chart showing how! We'll include Giant Electronics Catalog. Zalytron, 220-S West 42nd Street, NYC.

**FREE!** Giant wholesale catalog on electronics, hi-fi, transistor, scientific, hobby, optics, photographic, housewares, jewelry, tools, novelties, toys. Write: Lektron, 131S Everett Ave., Chelsea 50, Mass.

**FREE** Flyer Monthly, Electronic Surplus. Kurtz, 702B Bay, Staten Island 4, N. Y.

**KITS:** Shortwave Radio \$3.50—Crystal Radio 75c. Alliance, 2059—60th St., Brooklyn 4, New York.

**GOVERNMENT** Surplus Snooperscopes, Ham Gear, Mine Detectors, Parabolic Reflectors, Telescopes. Picture Catalog 10c. Meshna, Malden 48, Mass.

**ELECTRIC** Guitars, amplifiers, wholesale. Free catalog. Carvin, PSR, Covina, California.

## 37 BUSINESS OPPORTUNITIES

**IMPORT-Export** opportunity, profitable, world-wide, mail-order business from home, without capital, or travel abroad. Established world trader ships instructions for no-risk examination. Experience unnecessary. Free details. Mellinger, C692, Los Angeles 24.

**11,000 NEW** Prospects Daily. Baby record books, shoes, albums. Sell mailorder. Use our literature. Write: No-Co-Ro, Capitola, California.

**YOUR** Own Import Mail Order Business! Deal with over 400 manufacturers, exporters of the world. Complete Import procedures, international drop-ship methods. Capital unnecessary. Free details. Associated, Box 2068-P8, Sioux City 4, Iowa.

**YOUR** envelope addressed accurately, reasonably. Fast service. We have capable addressers in your city. Glenway System, Box 6568, Cleveland 1, Ohio.

**\$70 WEEKLY**—Home, spare time. Simplified mail bookkeeping. Immediate income—easy! Auditax, 34757D, Los Angeles 34.

**QUICK** profits, with no capital! Take orders for magazines your neighbors like, want. Make cash on the spot! We show how with Free kit. Get yours now. Write McGregor Magazine Agency, Dept. 342, Mount Morris, Ill.

**FIX** Typewriters. Free Repair Course. Home operated. Remit 25c for book explaining Free Course and Agency Appointment. Athey, Tarentum, Pa.

**GROW** Orchids at home. Profitable, fascinating. Successful home grower explains special light, temperature and humidity conditions orchids need. Free—Full details. Orchids, 100 S. Vermont, Los Angeles 4.

**MAKE** Extra Money—Big Cash Commissions plus premiums for you and your customers. Sell Advertising Book Matches—sensational new Tenorama, Glamour Girls, Hillbillies; dozens others. All sizes—Quick daily sales; big repeat business. Free Master Kit makes selling easy—no experience necessary. Superior Match, Dept. PX-260, 7530 Greenwood, Chicago 19, Illinois.

**\$250.00 WEEK** profit possible. Earn at home spare time with fascinating Printing method. \$5 starts you—send no money now. Free Confidential Facts and Valuable Samples. Screen-Print FY, Los Angeles 61.

**FREE** Name Brands Catalog! Your own high profit business. Sell Name Brands, full or part time. No inventory—no investment. More than 2000 Name Brand items; lowest wholesale prices. Watches, jewelry, cameras, hi-fi, stereo radios-phonos, appliances, housewares, hardware, power tools, luggage, musical instruments, garden equipment, sporting goods, toys, many others. 8 Floors of Name Brands. Million dollar inventory. Orders shipped complete within 24 hours. Send for Free beautifully illustrated catalog Now! Separate wholesale price list. H. B. Davis Corp., Dept. 14, 145 West 15 St., New York 11, N. Y.

**BRONZE** Baby Shoes: Instructions, Equipment and Mountings for genuine Electroplating Process. Largest Supplier of all Plating Equipment, Supplies. Free Catalog. Hollywood Bronze Supply, Dept. B-1, 1624 East First, Los Angeles 33, California.

**OPERATE** profitable mail order business. Write Walter Service, 4159-B East 112th, Cleveland 5, Ohio.

**IF** You Like Motorcycles And Money then send for Harley-Davidson Dealership Book on how to become a franchised dealer of motorcycles and a new line of motor scooters. Here's a chance to own your own business with a very modest investment. The youth market is beginning to explode and the next few years promise a chance to cash in on it. Write for free illustrated Dealership Book Today. Harley-Davidson Motor Company, Dept. P.S., Milwaukee 1, Wisconsin.

**\$3.00 HOUR**—home, sparetime, assembling pump lamps. Easy. Free Details. Ougor, Caldwell, Arkansas.

**PLATE** Baby shoes, jewelry, gifts. Bronze and colored pearl. We finance home businesses. Booklet free. Williamson, 11029 South Vermont, Los Angeles 44.

**"50 NEW** Home-Business Ideas" Booklet, sample Free. Spray exotic Velvet-Suede on anything. Flokcraft-FY, Los Angeles 61.

**I GOT** rich in the Dry Cleaning Business—with no investment—so can you. Free details. Write—Imperial School of Dry Cleaning, Dept. PSC, 1700 Touhy Avenue, Chicago 26, Illinois.

**GROW** living Miniature Forest (only inches high)—or orchard that bears tasty tiny fruit. Learn amazing Dwarfing secrets! Fascinating hobby! Profitable Home-business Opportunity! Free Seeds and Plan. (State your age.) Miniature Nurseries, Dept. FY, Gardena, California.



# POPULAR SCIENCE OPPORTUNITIES

**FREE** Picture Folder. "How to Make \$3,000. Yearly. Sparetime. Backyard. Raising Earthworms!" Oakhaven-42, Cedar Hill, Texas.

**BIG Money**—Operate own Fix-it Shop. Service household appliances, motors, mowers, saws, skates, etc. Free Book. Christy Trades School, A-9201, 3214 Lawrence, Chicago 25.

**GAME Warden**, Government hunter, Forestry, Park and Wildlife Services announce job openings. All states. Enjoy outdoor work, good pay, real security. Complete information Free! Write North American School of Conservation, Dept. DC-182, 1038 S. La Brea, Los Angeles 19, Calif.

**LEARN** Professional TV Servicing in one week! Fabulous new simplified system. No big expense. No studying. No tools or equipment. Spare, full time. Own your own big profit business! Save! Amazing but true! Free! Write, TV Systems, Dept. DC-182, 1038 So. La Brea, Los Angeles 19, Calif.

**FREE** Book "609 Odd, Successful Businesses." Box 1001-PSG, Evanston, Ill.

**BE** a Notary. Information: Stationers, 515PS E. 33rd, Kansas City 9, Missouri.

**FRANCHISES** make profits! Operate your own independent franchised business as distributor, dealer or agency owner. Nationwide opportunities. National Franchise Reports is the recognized source for information regarding the booming franchise field. Write today for interesting free details of this helpful service. National Franchise Reports, Y-528, 333 North Michigan, Chicago 1.

**FREE** Sample Of The Secret Key that has made Millions in Mail Order! Free details reveal biggest profit-making Home-Import Mail Order Opportunity ever offered! Mail Order Importers, Dept. B-62C, 15201 South Broadway, Los Angeles 61, Calif.

**WANTED**, Men, Women. Raise bait for us at home. Full, spare time. Doesn't take up space. We furnish everything. Sherwood, Dept. U5, Monmouth, Maine.

**LEARN** Appliance service and repair. Motors, washers, refrigeration, cleaners, everything. Free booklet. Appliance, 11027 South Vermont, Los Angeles 44.

**\$100.00 WEEKLY** spare room. Raise redworms soilless way. Odorless. Charlie Morgan, Box 116C, Bushnell, Florida.

**WILL** You test new items in your home? Surprisingly big pay. Latest conveniences for home, car. Send no money. Just your name. Kristee, 115 Akron, Ohio.

**MAIL-Order** home business. Get Free Copy. "Make Money in Mail-Order". Mailco, 1717 Westwood, Dept. C692, Los Angeles 24.

**MAGAZINES**, Catalogs, Money Making Opportunities, 25c. Jack's House of Values, 3057 Brighton 4th Street, Brooklyn 35, New York.

**EARN** Good Money sharpening chain saws, scissors, cutters, knives. Free Manual. Treyco, North Tonawanda 1, New York.

**MAILORDER** To Motels, Churches, institutions. Complete individual set-up, not just instructions. Hermes Advertising, 152 West 42, New York City 36.

**HOW** to have your own profitable Mail Order Business with potential \$34,736 Net Profit annually. Write: VFG Company, Box 1143-25, Dallas 21, Texas.

**BRITISH** Courses. Export-Import, Mail Order. Wade, Holdershill Crescent, London NW4, England.

**PROFITABLE** Home Mail Order Business! Particulars Free. Progressive, Box 422-A, Raymond, N. H.

**MANUFACTURER** Fishing Lures. Plastic, none better. 20 Models, Pennies. Free circular. Quaker, 3514-24 N. Lawrence, Phila. 40, Pa.

**FREE** Literature — Make Big Money Raising Fishworms and Crickets. Carter Farm, Plains, Georgia.

**IMPORT**, Mail-order, plastics offered in new three-in-one money making opportunities. Free details. Trialpha, 7950 Mammoth, Dept. H20, Van Nuys, Calif.

**LIQUID** Rubber, molds, figurines. Catalog 25c. Steece Bros., Box 177-S, Sioux Falls, So. Dak.

**MARKETS** Everywhere. Make Artistic concrete birdbaths, pottery, Best coloring. Home workshop. Hundred varieties. Hollywood Cementcraft, 8527-N Wonderland, Hollywood 46, California.

**FOURTEEN** Magic methods for extra home income. Free illustrated catalog. Derco, Box 494, Muncie, Ind.

**BUY** Direct From Factories—Appliances, Cameras, Watches! Free details! Cam Company, 6810PS-20th Ave., Brooklyn 4, New York.

**PEST** Control pays big money full or spare time. Homes, offices, stores, factories, pay big fees for insect, rodent control. \$50 job requires 50c in material, 50 minutes time. Quick, easy to learn. Complete course teaches everything in weeks; pays big for a lifetime. Write for Free details. Pestrol, Dept. B-2, 6238 N. Broadway, Chicago 40, Illinois.

**VENDING** Machines—No Selling. Operate A Route of Coin Machines And Earn Amazing Profits. 32-Page Catalog Free. Parkway Machine Corporation, Dept. 18, 715 Ensor Street, Baltimore 2, Maryland.

**RE-Cast** junk batteries into new. Latest achievements. Battery Laboratories, Bayou LaBatre, Alabama.

**FREE** List Needed Inventions. Protection Form. Inventors Sales and Engineering Bureau, Dept. 462-E, Box 4973, Washington 8, D. C.

**QUICK** Money! "Repairing Car Batteries." At home! Easy, too! Free Details! Batteryman, Penrose, Colorado.

**CASH** from Sawdust, Tin-Cans, Newspapers. Over 200 methods. Instructions \$1.00. Charles Company, 42-DPE, Norwood, Ohio.

**PIANO** Tuning learned quickly at home. Tremendous field! Musical knowledge unnecessary. Information free. Empire School of Piano Tuning, Champaign, Illinois. (Founded 1935.)

**PLASTERCRAFT** molds, liquid rubber, plasters, flocks, candle supplies. Catalog and manual free. Jayhawk Plasters, Blue Rapids, Kansas.

**WHOLESALE!** World's largest supply. Buy from 257 American, European, Japanese wholesalers. Tailormade suits from Hong Kong. Free details. International Buyers, 216-S Jackson, Chicago 6, Ill.

**MAKE** flexible molds. Cast plaques, figurines. Free sample. Tooker, 1045-A Fairview, Hamilton, Ohio.

**BIG** Money—Building. Repairing with Strange New Plastic. Durable—Attractive, 800% Profit. Bays Laboratory, Chinle, Arizona.

**OPERATE** Profitable "Low Cost" Mail-order Business! Liberty, 210 Fifth Avenue, New York 10, N. Y.

**MUSHROOMS** Quicker, Easier, Cheaper. "Magic" preplanted trays. Newest Facts Free. Spawn \$1.00. Luxorco, 641 South 19th St., Newark 3, N. J.

**MAKE** \$46 From Square Foot Plywood; Jigsaw necessary. Free Details. Woodarts, Bridgewater, Mass.

**\$75.00 FIRST** week in your own mail order business. Complete Beginner's Plan. Home operated, spare-full time. Everything supplied. Wayne's Service, 3016-J Channing N.E., Washington 18, D. C.

**100% PROFIT** selling reconditioned spark plugs. Free Sample. Lee, 1608-K Roberts, Houston 3, Texas.

**A NATURAL** for sporting goods, boat, hardware, auto dealers, service stations, ambitious individuals. Become dealer for nation's number one camping trailer. Sets up into complete camp in just one minute! Dealer details by return airmail. Hellite Trailers, 1509 South Sacramento, Lodi, California.

**"EVERYBODY** Likes Candy" — Make Professionally Home . . . (Our 48th Year.) Ragsdale Candies, D107, East Orange, New Jersey.

**OPPORTUNITY** to earn \$15,000-\$30,000 annually. Franchise protected. Granted on \$12,500 basis. Live at home. No merchandise to buy. Selfemployed. One of most exclusive and noncompetitive Businesses in United States and Canada. Send for free explanatory booklet. Harrell and Company, Box 8-D, Louisville, Illinois.

**CANDIED** Popcorn and Potato Chip Equipment. Eakins, Box 933-BO, Springfield, Ohio.

**INTERNATIONAL** Mailorder Business made easy. Individual setup service. Not just instructions. Hermes, 152 West 42, New York City 36.

**OWN** a restaurant, diner, food stand in your area. Little or no capital needed! Revealing details Free! National Restaurant Owners' Training, Dept. PS-2, Box 73332, Gardena, California.

**OPERATE** Mailorder folio business. Free details. Ballard, 1834 Edgeland, Louisville 4, Ky.

**COLORGLAZED** Concrete pottery made without molds. Patented method. Cemetery products, novelties, tiles. Basement leak-sealing. Money-making projects. Booklet, details free. Men only. National Potteries, Grand Rapids, "Minnesota."

**\$34.70 TWO** Hours. Manufacturing Concrete Products. No Selling. Carlayn Castings, 1803 Fremont, Rapid City, South Dakota.

**SELL** books by mail without stock. Big profits. Talliaferro, 832-S Monroe, Fort Worth 2, Texas.

**FREE** Imports From Overseas. Particulars Free. Bassens Imports, 828 Fullerton, Chicago 14, Ill.

**BUY** Weatherstripping. Exceptional Profit. All-metal, simple to install. Write E-Z On, (PS), 1009 Harvard Terr., Evanston, Ill.

**\$75.00 WEEKLY** possible mailing catalogs. Roe, 2317M Marshall, Chicago 23, Ill.

**BAKE** New Greaseless Doughnuts In Kitchen. Sell stores. Free recipes. Summers, 3605 South 15th., Minneapolis 7, Minnesota.

**SELL** Books by mail. 400% profit. Royal, Box 368-M, Cleveland 27, Ohio.

**NATURAL** Molding Rubber: Extra Thick. Free Sample. W. Wooley, 1016-B Donald, Peoria, Illinois.

**METALIZE** Baby Shoes; Repair Dolls; Rebuild Batteries; Catalog "75 ideas" Free. Universal, Box 1076-B, Peoria, Illinois.

**WHAT** is this Mail Order Business? Get the one true answer. John Bishop, Box 153A, Ojai, California.

**NEED** Extra Money? Collect plants and animals needed by scientists. Send \$1.00 for specimen descriptions, prices, and addresses of buyers. Biological Collector's Service, Box 153, Mount Vernon, Iowa.

**FISHWORMS**—Gold hibreds, banded breeders. \$4.50 per thousand. Texas Wormery, 7717 Navajo, Fort Worth 14, Texas.

**MOLD** Statuary, Pottery, Tiles. Novelties—5c materials makes dollar sellers! Particulars free. Marbleizing Service, Edwardsville, Illinois.

**LIQUID** Molding Rubber. Free Sample. Shellcraft Supplies, Chaney's, 1907-C East Road, Jacksonville 11, Fla.

**PLAQUES**—Figurines—Molds. Free Details. Russo, 1194 Brooklyn Ave., Brooklyn 3, N. Y.

**"HUGE"** Cash Returns! "Charted Mail-order Opportunities" Everything furnished! National, Box 508, Campbell, California.

**LEARN** landscaping and growing of plants. Latest information on propagation, soil testing, plant growth regulators, garden design and color. Many money-making opportunities. A lifetime career's home study course. Free booklet. National Landscape Institute, Dept. PSC-20, 11826 San Vicente Blvd., Los Angeles 49, Calif.

**DOLLS!** Dolls! Dolls! We teach you to repair, make, sell all kinds of dolls and accessories including clothing. Study at home. Earn while you learn. Free catalog. Doll Hospital School, Studio PSC-20, 11826 San Vicente Blvd., Los Angeles 49, Calif.

## 38 MONEYMAKING OPPORTUNITIES

**MAKE** Money Writing Short Paragraphs! No tedious study. I tell you what to write, where and how to sell; and supply list of editors buying from beginners. Many small checks add up quickly. Write to sell right away. Send for free facts. Benson Barrett, Dept. C-86-N, 7464 Clark, Chicago 26.



# POPULAR SCIENCE OPPORTUNITIES

**DETECTIVES**—Work home—Travel. Experience unnecessary. Detective Particulars free. Write Wagoner, P-125 West 86th, New York 24.

**MAKE Big Money Selling Books by Mail!** Free details. Write today! Direct Mail Service, Dept. PS, Box 581, Bakersfield, California.

**SELL Diamonite Gems:** more brilliant than diamonds. Credit arranged. Catalog 10c. Diamonite, 2420-S 77th, Oakland 5, California.

**MAIL Trade Magazine** has moneymaking opportunities galore. Sample 25c. Donovan, 79-PS Greenbelt, Levittown, New York.

**EASY** to start rubber stamp business at home in spare time. Make up to \$9.80 an hour without experience. Facts free. Write to Roberts, 1512 Jarvis, Room CR-3-A, Chicago 26.

**AMAZING** successes through franchises! Become exclusive franchise holder your territory. Information rushed. National Franchise Reports, SP-528, 333 North Michigan, Chicago 1.

**START Big-Pay** business at home in spare time. No experience needed to operate little table-top machine for bronzing baby shoes. Make \$5.46 profit on every pair. Full particulars free. Send postcard to Mason, 1512 Jarvis, Room CM-3-A, Chicago 26, Illinois.

**LEARN** Appliance service and repair. Motors, washers, refrigeration, cleaners, everything. Free booklet. Appliance, 11027 South Vermont, Los Angeles 44.

**OPERATE** Profitable Home Import Business! Details Free. Direct Mail Service Company, Box 581, Bakersfield 11, California.

**MINK** Raising information free. Complete. Lake Superior Mink Farm, Superior EE, Wisconsin.

**AMBITIOUS** Single Men—\$1,000.00 A Month Average For Life. No Selling. Adventure, Riches, Romance, From Profitable Spare Time Recreations Paying Operators Thousands Monthly. Seem Fantastic? I'll Show You How. Write Shirl E. Brunner, Box 575, Waianae, Oahu, Hawaii.

**INVISIBLE** Reweaving: \$5 in one hour possible reweaving burns, tears, mothholes. Spare-Full time. Free Details. Skill-Weave, Dept. WC-132, 335 W. Madison, Chicago 6.

**MAKE** \$5,000 yearly sparettime raising mink, chinchillas, nutria, etc. Free booklet reveals proved plans. Write: Furs, 588 Mt. Pleasant Road, Toronto 2, Canada.

**MOULD** Marbleite Novelties: (Very Profitable) Guaranteed. Market, Information, \$1. Empson, 430 Pearl, Jeffersonville, Indiana.

**MAKE** Easy Money Addressing-Mailing! Pleasant Work. Write—Merrill Hestand, Box 182R, Hatfield, Pa.

**JAPAN'S** Finest, Exotic Earrings! Details free. Ohga, PSER178, Sigakenkusatu, Japan.

**YOUR** Name on our Giant Mailing List, brings you moneymaking and other mail offers galore! Send 25c today! Direct Mail Service, Dept. PS, Box 581, Bakersfield, California.

**WE** Want permanent men to make \$4.00 or more per hour assembling our TV "Snak-rak" (Trademark) at home. Information \$1.00 to eliminate curiosity seekers. Stobal Productions, P.O. Box 407, Birmingham, Ala.

**\$200.00 WEEKLY** Buying Gold. D'Amico, 1506 W. Erie St., Chicago 22.

**MONEYMAKING** Homework! Immediate Commissions! Permanent! Louis Hirsch, 1301-11 Hoe, New York City 59.

**PROFITABLE** Homework! Guaranteed Earnings. No Selling. Everything Supplied. Elvee, 556 Beacon, Manchester, N. H.

**VENDING** Machines—No Selling. Operate A Route of Coin Machines And Earn Amazing Profits. 32-Page Catalog Free. Parkway Machine Corporation, Dept. 19, 715 Ensor Street, Baltimore 2, Maryland.

**CIGARETTES**—Make 20 plain or filter-tips for 9c. Facts free. Moberly, Box 911, Owensboro, Kentucky.

**HUSBANDS & Housewives** Wanted! Big money. Spare or full time cake decorating and candy making. Turn your kitchen into a gold mine. No age, education limits. Complete instruction, learn and earn at home. Write for free facts: Candy And Cake, Dept. 630, Fallbrook, California.

**GET** Listed Receive Money Making Propositions For Life. Details Free. Andy's, Bryson City, N. C.

**FREE** Literature — Make Big Money Raising Fishworms and Crickets. Carter Farm-11, Plains, Ga.

**\$50,000 YEARLY** Possible. Distribute sales literature your territory. Write Afja, Box 33-C, Southfield, Michigan.

**\$200.00 MONTHLY** Spare Time. With Tablesaw, Bandsaw or Jigsaw. Write. Holiday House, 7222 4th Plain, Vancouver, Washington.

**IN 1952** I was unemployed, broke. Today own \$18,000 home, drive Cadillac, have bank account. Anyone can do this. N. Cole, 217 West 49th, Bradenton, Florida.

**BOSS** your own home business. Profits 1200% to 3000% — Make, distribute stunning Shellcraft Jewelry. Sells itself wherever displayed. Big repeat demand! Details free! Shellcraft, Dept. E, Box 804, Panama City, Florida.

**MAKE** Money Clipping Newspapers. For information, write, Newscraft, PS-983-E, Main, Columbus 5, Ohio.

**A NATURAL** for sporting goods, boat, hardware, auto dealers, service stations, ambitious individuals. Become dealer for nation's number one camping trailer. Sets up into complete camp in just one minute! Dealer details by return airmail. Heilite Trailers, 1510 South Sacramento, Lodi, California.

**"DUPLICATING** Keys for Profit."—Informative, illustrated, \$1.00. Keys, 1616 Lowry, Rantoul, Illinois.

**MAKE** Money selling wedding invitations. Sample album \$1.00. Refundable. J. D. Rahall, 553 Orchard, Beckley, W. Va.

**\$240.00 MONTHLY** with jigsaw. Details. Elkman, 346 North Summit, Sioux Falls, South Dakota.

**OPERATE** home Mail-order Business. Vosacek Printing, 4444PS Ute, San Diego 17, Calif.

**MEN — Women!** Start Money-Making Plastic Laminating Business at home in spare time. Material that costs 11c brings back \$2.58. No canvassing or selling but mail orders bring in \$20 a day. Write for full particulars Free. Rush name on postcard to Warner, Room CL-3-A, 1512 Jarvis, Chicago 26, Ill.

**TYPISTS!** Make Money At Home! Mailers, 2 Madison, Greencastle, Indiana.

**"HOW To Make More Money"**—Jobs, businesses, investments. Free literature. Shorelands, 20 W. Jackson, Suite 1412-L, Chicago 4.

## 38A BUY IT WHOLESALE

**LARGEST** Wholesale Supply Source in U.S. Get free catalogs. Furniture, clothing, appliances, autos and accessories, farm equipment, tools, housewares, hobby supplies. Free details. Associated Wholesalers, Box 2068-C, Sioux City 4, Iowa.

**NEW** Multicolor Wholesale Catalog—automobile catalog—and others. Housewares, appliances, refrigerators, freezers, washers, dryers, television, radios, furniture, clothing, luggage, binoculars, phonographs, recorders, cameras, projectors, typewriters, sewing machines, power tools, toys, sporting goods, watches, jewelry—name brands—huge discounts. Postcard: Selbyco, Decatur 165, Illinois.

**BUY** Wholesale. 100,000 Nationally Advertised Products. Appliances. Cameras. Sporting Goods. Housewares. Watches. Typewriters. Tools. Clothing, etc. Discounts to 60%. Buy-Rite, Box 258, Hawthorne 3, New Jersey.

**DISCOUNT** Catalog 25c. R & S Specialties, P. O. Box 1382, Joliet, Ill.

**HELP!** Purchase everything wholesale. Automobiles, boats, diamonds, furs, guns, homes, trailers, vending. Write Wholesalers, 446, Jacksonville, Illinois.

**ELECTRIC** Guitars, amplifiers, wholesale. Free Catalog. Carvin, PSW, Covina, California.

**JUST** Out! New 388-page, illustrated catalog offering savings up to 50 per cent on over 100,000 auto parts and accessories, many hard to get. All makes (1920 to 1960 models), trucks, foreign and sport cars. Also Hollywood accessories, custom styling, hi-speed equipment. Send 25c for postage, packing—refundable on first order. Whitney, 1919-PB Archer, Chicago 16, Ill.

**CLOTHING, Appliances, etc.!** Free Catalog offer! United Wholesalers, 1265 Broadway, New York 1, N. Y.

**50 KEYCHAINS** \$1.00. Entire family's lifetime supply. Able, 124 West 18th St., New York 11, N. Y.

## 39 FORMULAS, PLANS, ETC.

**FORMULAS**—All Kinds—Moneymakers. Three catalogs, Dime. Kemico, Park Ridge 15, Illinois.

**OPPORTUNITIES**, Unlimited! World's finest formulas. Product development. Analysis. Monthly product report. Exciting details free. Alpha-Midwest, LaPorte, Indiana.

**LATE** Modern Manufacturing Formulas List Free. Chemical Service, Martville, New York.

**LARGE** Formula Catalog 10c Big Surprise. Western Chemical, Salem, Oregon.

**SPECIAL** Formulas for latest moneymaking discoveries. New! Good! Profitable! Valuable Literature Free! Miller, Chemist, 1517-N, Tampa, Florida.

## 40 PLASTICS

**LEARN** Plastics Fabrication For spare time income. Low cost home training now available. Write for free booklet. Interstate Training Service, Dept. D-2, Portland 12, Oregon.

**NEW** Liquid casting plastic, clear, colors. Embed real flowers, butterflies, photos, coins. Send 25c for two handbooks "How to Cast Liquid Plastics" and "How to Make Extra Money at Home." Castolite, Dept. B-102, Woodstock, Illinois.

**PLASTIC** and supplies for laminating. Colamco, 12 Center, New Haven, Connecticut.

**CELLULOID** scrap. Sheets, state thickness, colors. Plastics, Box 333, Kearny, New Jersey.

**ELECTRIC** Laminating Kit. Pleasure. Profitable. Burr, 330 East Centre, Kalamazoo, Mich.

**LAMINATING** Supplies. Price List Free. Solomonson, 4 Beacham, Everett 49, Mass.

**PLEXIGLAS** — Any thickness — Clear — Colors — Cut to size — Clear Rods — Tubing. McClarin Plastics, P.O. Box 168B, Hanover, Pennsylvania.

**EVERYTHING** in Plastics. Catalog 25c. GEL, Box 261, Union, N. J.

**NEW** Do-It-Yourself casting and Molding Plastics! No experience or Machinery Necessary. Send 25c for Big 64 page catalog. Castacraft Corp., Dept. A-13, P. O. Box 555, Palo Alto, California.

## 41 SCIENCE & CHEMISTRY

**AMAZING** New Book Of Science Experiments, formulas, and Catalogue of Laboratory Supplies. Only 35c. National Scientific Co., Dept. PS-2, 13 S. Park Avenue, Lombard, Illinois.

**36 RADIOACTIVE** isotope experiments for \$1.00. Atomic Researchlab, 10717 Venice, Los Angeles 34, Calif.

**CHEMICALS** and apparatus for industrial, analytical and private laboratories. Catalog 25c. Dept. M-26, Biological Supply Co., 1176 Mt. Hope Ave., Rochester 20, N. Y.

**MICROSCOPES**, educational, research, surveying. Instruments, electronics, optical, everything Japanese. Importers' prices, catalogs 25c. Magnification Instrument, 2 E. 45th, New York 17.

**ROCKET** chemicals, chemistry set refiles. Apparatus, glassware. Catalog 25c. Bio Chemical Products, 30-P Somerset, Belmont 78, Massachusetts.

**"EXPERIMENTS** in Pyrotechny." Book of fireworks-type experiments, plus electrical detonator plans. \$1.00. Debro Co., Dept. PSM, Box 216, Northfield, Minn.

**TELESCOPES**, microscopes. Illustrated Catalog 25c. Chambers Scientific, 124 West 23 Street, New York 11.

**CHEMICALS**, apparatus and glassware. Illustrated catalog 25c. Winn Chemicals, 124 West 23 Street, New York 11.

**ILLUSTRATED** Catalog; Chemistry, mineralogy, biology 25c. Tracey Laboratories, Evanston, Illinois.



# POPULAR SCIENCE OPPORTUNITIES

**MICROSCOPE** slides, anatomical. Free list. Bay, 409 Roosevelt Way, San Francisco 14, California.

**EXPERIMENTERS**:—"Bargains Galore" Catalog—25c (Refundable) Hagenow Laboratories, Manitowoc, Wisconsin.

**CHEMISTRY**—Science—Rocket Magazines. Literature Free. Lankton Bureau, Summerland Key, Fla.

**ECONOMICALLY** Priced! Laboratory Materials Catalog 20c. Starr Scientific, Manitowoc, Wisconsin.

"**SCIENTIFIC** Oddities," 60 Page Booklet, 10c. Franks, 3121 South Racine, Chicago 8.

**CHEMISTRY**, Biological Kit replacements, additional chemicals, apparatus, etc. Free lists. Chemicalab Supply, Box 5796, Detroit 39, Michigan.

**ROCKETEERS**: Supplies, Chemicals. Catalog, Plans 25c. Central Rocket Company, Waupaca, Wisc.

**UNUSUAL** Chemistry books, courses, kits! Rare chemicals, cheap! Catalog 25c. National, Box 133-A, Palo Alto, Calif.

**CHEMISTRY** Catalog, 25c; Experiment Book, 25c. Used list. Laboratory Sales, Box 161-B, Brighton, Mass.

**CATALOG** With 3000 Illustrations \$2.00. Laboratory Materials, 7319 Vincennes, Chicago.

**CHEMISTRY**-Microscopic-Insect: Butterflies-Rocks: Minerals-Sets Complete. Literature-Amateur Chemist and Microbiologist, 208 East Eleventh, Kansas City, Mo.

**EDUCATIONAL** Kits—Experiments in science for students, schools, group study, science clubs. Catalog 25 cents, refundable. Science Edu-Games, 793 Gr. Hy. N., Sebastopol, Calif.

## 42 HELP WANTED REPORTS

**LATEST** Foreign Employment—Unlimited Opportunities. America's largest leading overseas Researchers—\$2.00 (C.O.D.'s Accepted). Universal Researcher, Box 4912, Baltimore 20, Maryland.

**COPYRIGHTED** Reports. Best paying companies—travel, adventure, promotions, construction, aviation, shipping, oilfields, laborers, clerical, trades, supervisory, factory, unusual opportunities. Skilled—unskilled. Foreign—Stateside. Only \$2.00 (\$2.25 Airmail) (COD's Accepted). Satisfaction guaranteed. Included free: Special reports on Alaska—Venezuela—South America. Research Services, Meramec Building, St. Louis 5PS, Missouri.

**JOBS** on Steamships, Yachts, traveling foreign countries. Davenport's, 1354-J, GPO, New York 1, New York.

**FREE** Information — USA Overseas Jobs, High Pay, Transportation—Futures, Dept. P, 215 West 34th Street, New York City 1.

**FOREIGN** Jobs—Latin America, Alaska, Canada, up to \$1500 monthly. Up-to-date 1960 Foreign Service Directory gives complete information; hot list of firms hiring for Military and Civilian Construction, Aircraft, Oil, Exporters-Importers, Mining. How-When-Where to apply. 12th Successful year. \$1.00. Global Reports, Box 8873-P, Los Angeles 8, California.

**JAPAN!** Far East! Many hi-paying jobs available now. All types. Complete, detailed reports \$2.00. Walts, Box 903, C.P.O., Tokyo.

**WANT** A Good Overseas Or Stateside Job With Higher Pay?? Transportation Paid. Men—Women. Free Information. Employment Headquarters, 79 Wall Street, Dept. D-5, New York 5.

**RICHES** can be yours! Are you rich? If not, send immediately for that new nationally advertised book "How to Get a Good Job." Hundreds of fact-packed pages. Only \$4.00, money-back guarantee. Winter & Wiechels, Dept. 20-A, College House, Harvard Square, Cambridge 38, Mass.

**JOBS**, Ships. \$100 Weekly Beginners Travel, Adventure. Details Free. Seamen's Service, Box 17-P, Brooklyn 8, N. Y.

## 43 AGENTS WANTED

**MAKE** Money selling sensational Dwarf Trees—bear Giant-Size Apples, Peaches, Pears. Ornamental. Also Stark-Burbank Standard Trees, Roses, Shrubs, Vines, etc. Outfit Free. Stark, Dept. 30120, Louisiana, Missouri.

**EVERY** Man A Prospect. Request Refundable Sales Kit offer showing line of belt buckles, tie clasps, money clips, cuff links, lapels individualized with customer's name and emblems, also cap badges for trucking, bus, taxi, police, firemen. Choice 3,000 emblems. Hook-Fast, Box 1425-PS, Providence, Rhode Island.

**GOLD** or Silver letters, numbers. Windows, Doors, Trucks 1" to 6" 500% Profit—Free Samples. Atlas-U, Box 543, Oak Lawn, Ill.

**START** Your Own Business On Credit (U.S. and Canada). Your own boss. 1383 Dealers sold \$5,000 to \$33,500 in 1958. We supply stocks, equipment on credit. 200 home necessities. Sales experience unnecessary. Pleasant profitable business backed by world-wide industry. Write Rawleigh's, Dept. B-U-PSC, Freeport, Illinois.

**MEXICAN** art goods! Free Sample! Send 14c stamps mailing. Sylviaal, Apartado 9036, Mexico City.

\$1,000.00 a month for making dramatic 3-second demonstration of amazing lightweight Presto Fire Extinguisher. New chemical used by Airforce snuffs out fires instantly. Only \$4.95. Terrific commissions. Millions want it. Free Kit. Merlite, 114 E. 32nd, Dept. P-66K, New York 16.

**YOUR** Own business—Suits \$1.50; Overcoats 65c; Mackinaws 35c; Shoes 12½c; Ladies' Coats 30c; Dresses 15c. Enormous profits. Catalog Free. National Mail Order, 2111-J Roosevelt Road, Chicago 8, Ill.

**MEN!** Women! 60% profit on cosmetics. Famous nationally advertised Hollywood cosmetics pay 60%. Make \$25 day up. Hire others. For free samples, details, write Studio Girl, Glendale, Calif. Dept. 1102J.

**WILL** you wear new suits and topcoats without one penny cost and agree to show them to friends? You can make up to \$30.00 in a day even in spare time, without canvassing. Pioneer Tailoring Co., Congress & Throop Sts., Dept. C-1226, Chicago 7, Illinois.

**MEN-Women** Agents: Sensational new moneymakers — Beautifully hand-painted plastic personalized photo enlargements, compacts, rings, bracelets, lockets, etc. Simply take orders, pocket 40% commission—we deliver and collect. Sales outfit free. Novelco, 3343 North Avenue, Chicago 47.

**AGENTS**—300% profit selling genuine gold window letters; stores and offices. Free samples. Metallic Sign Letter Co., 1217-E West Newport, Chicago.

**SEEKING** New Products? Get my outfit 47 moneymaking specialties. Latest conveniences for home, car. Send no money. Just your name. Kristee, 71, Akron, Ohio.

**CALENDARS**, Advertising Novelties, Matches. All styles, including Religious. Varnished 12 sheets. Girls. Hundreds of Advertising Novelties, Book Matches, etc. Fleming Calendar Co., Promotional Division, 6539 Cottage Grove, Chicago 37, Ill.

**AMAZING** Greeting Card Money-Makers! Make \$75.00 on 100 Deluxe \$1.25 Assortments. Exclusive \$1 Gift Novelty out-selling everything! Big line; newest ideas. Largest profits; Gift Bonuses. Experience unnecessary. Free Stationery portfolio, samples on approval. Exclusive \$1 Gift Seller Free for promptness. Creative Cards, 4401 Cermak, Dept. 516-N, Chicago 23.

**RUN** a spare-time Greeting Card and Gift Shop at home. Show friends samples of our wonderful new 1960 All-Occasion Greeting Cards and Gifts. Take their orders and earn up to 100% profit. No experience necessary. Costs nothing to try. Write today for samples on approval. Regal Greetings, Dept. 60, Ferndale, Michigan.

**DON'T** miss our ad under "High-Grade Salesmen" in this magazine. National Press.

**CLEANS** Windows without mess. Strange "dry" cleaning-cloth. Replaces liquids. Windows gleam. Samples sent on trial. Kristee, 70, Akron, Ohio.

**ANYONE** can sell famous Hoover Uniforms for beauty shops, waitresses, nurses, doctors, others. Miracle fabrics Nylon, Dacron, Wash 'N Wear Cottons. Exclusive styles, top quality. Big income, real future. Equipment free. Hoover, Dept. B-101, New York 11, N. Y.

**BIG** Profits — Stamp Social Security Plates Key Protectors. Sample—50c. Catalog Free. General Products, 184-PS State, Albany 10, N. Y.

**100% PROFIT** selling reconditioned spark plugs. Free Sample. Lee, 1608-C Roberts, Houston 3, Texas.

**EASY** handwork makes fast-selling useful articles. Sample free. Sunmade Company, Brockton 64, Massachusetts.

**ENJOY** Camping: Make big profits while you play, with Heilite Camping Trailer dealer franchise. Sets up into complete camp in just one minute; attracts crowds wherever shown! Write for dealer program. Heilite Trailers, 1508 South Sacramento, Lodi, California.

**BUSINESS** of your own. Earning potential as high as \$40,000 annually. Issued on \$12,500 base. No merchandise to buy. Send for free explanatory booklet. Harrell & Company, Box 8-DD, Louisville, Ill.

**WANTED** Fire Extinguisher salesmen. Huge Profits. Out-O-Matic, 1737K E. 31st Ave., Denver, Colo.

## 44 HIGH-GRADE SALESMEN

**YOUR** free copy of World's biggest sales magazine tells you how and where to make more money on your own in selling. Write Specialty Salesman Magazine, Desk 6B, 307 North Michigan, Chicago 1.

**MAKE** Extra Money—Big Cash Commissions plus premiums for you and your customers. Sell Advertising Book Matches—sensational new Tenorama, Glamour Girls, Hillbillies; dozens others. All sizes—Quick daily sales; big repeat business. Free Master Kit makes selling easy—no experience necessary. Superior Match, Dept. P-260, 7530 Greenwood, Chicago 19, Illinois.

**IF** you're interested in making money in selling, see the hundreds of exceptional opportunities in Salesman's Opportunity Magazine. Send name for your copy, absolutely free. Tell us what you're selling now. Opportunity, 848 N. Dearborn, Dept. 18, Chicago 10, Illinois.

**MAKE** Extra Money selling advertising matchbooks. Free catalog and sales outfit. Matchcorp, Dept. PS-20, Chicago 32.

\$1,000.00 A month for making dramatic 3-second demonstration of amazing lightweight Presto Fire Extinguisher. New chemical used by Airforce snuffs out fires instantly. Only \$4.95. Terrific commissions. Millions want it. Free Kit. Merlite, 114 E. 32nd, Dept. P66K, New York 16.

**BUSINESS** Kit Free! Postcard puts you in business! Complete line 230 shoe styles, also jackets! New discoveries pay Big Commissions. No investment. Send for Free Kit. Mason, Chippewa Falls K-303, Wisconsin.

**I'LL** send you Free stocking sample newest advancement in hosiery since nylon. Patented, full-length. Stays up over-the-knee without supporters, without girdle! National advertised price \$1.95. Make money introducing to friends at \$1.00 pair. American Mills, Dept. 351, Indianapolis, Ind.

**SALESMEN**. Big money showing nationally advertised Down-Spout-O-Matic—sensation wherever shown. Attaches to all down spouts—uncoils when it rains—recoils after it rains. Once in a lifetime item. Dry basements guaranteed. Commissions advanced. Special sample offer. Campbell Co., Rochelle 64, Illinois.

**GET** New Shirt Outfit Free; make \$90.00 weekly on 5 average orders a day. Famous quality Made-To-Measure dress and sport shirts at \$3.95 up, sell fast to all men. No experience needed. Full or part time. Write: Packard Shirt Co., Dept. 131, Terre Haute, Ind.

**EARN** Big Commission Full Or Part Time. Build profitable business of your own selling America's largest line low priced business printing. 360 page catalog, samples, hundreds of items used daily by business people. Imprinted ball pens low as \$8.95 for 100. Calendars low as \$5.95 for 100. Free sales kit. National Press, Dept. 9, North Chicago, Illinois.



# POPULAR SCIENCE OPPORTUNITIES

45

## EDUCATIONAL & INSTRUCTION

**LEARN** While Asleep with your recorder, phonograph or amazing new "Electronic Educator" endless tape recorder. Details free. Research Association, Box 24-NN, Olympia, Washington.

"HOW To Train Horses"—A book every one who likes horses should have. Free. No obligation. Simply address Beery School of Horsemanship, Dept. 5814 Pleasant Hill, Ohio.

**HIGH** School Diploma at home. Licensed teachers. Approved materials. Southern States Academy, Station E-12, Atlanta, Ga.

**USED** Correspondence Courses and Books sold and rented. Money back guarantee. Catalog free. (Courses Bought.) Lee Mountain, Pisgah, Alabama.

**BE** a Real Estate Broker. Study at Home. Write for Free book today. GI approved. Weaver School of Real Estate, 2018R Grand, Kansas City, Mo.

**MASTER** Watchmaking at home. Free sample lesson. Chicago School, 2328-WB Milwaukee, Chicago 47.

**STUDY** For Doctor's Degree of Psychology, Metaphysics and Divinity. Correspondence courses only. College of Divine Metaphysics, Dept. P-S, 2811 North Illinois, Indianapolis 6, Ind.

**BECOME** Tax Consultant. Graduates earn \$1,000-\$3,000 every tax season preparing returns evenings. State approved. Union Institute, Lakewood 1H, N. J.

**WANT** a Diesel Job? Higher pay? Advancement? We can help you qualify! Complete Diesel, Tractor and Heavy Equipment and Cummins Diesel Engine Shop-method home-training courses available. Write today. Interstate Training Service, Dept. B-2, Portland 12, Ore.

**EARN** While You Learn Auto and Diesel Mechanics. Master this top paying trade. Many graduates earn \$100 a week and up. Approved for Korean veterans. For free information write Dept. No. 262, Nashville Auto-Diesel College, Nashville 3, Tenn.

**PROFITABLE** welding training available Hobart Trade School, Box P-202, Troy, Ohio. GI approved. Finest equipment in U.S.A. Reasonable prices. Request catalog.

**FINISH** High School at home, spare time. No classes. Diploma awarded. Write for Free catalog. Wayne School, Catalog HBA-89, 2527 Sheffield, Chicago 14.

**ENGINEERING** and Art Degrees earned through home study. Electronics, Electrical, Mechanical, Civil, Physics, Business Administration, Liberal Arts. When writing, specify course desired. Pacific International College of Arts & Sciences, primarily a correspondence school. Resident classes also carried. 5719-A Santa Monica Boulevard, Hollywood 38, California.

**BLUEPRINT** Reading—Homestudy. Write Belton, 1059B North Lawndale, Chicago 51J, Ill.

**BOOKKEEPERS**—Operate Your Own "Dollar-A-Week" System. Ellis, Box 200, Cedar Grove, North Carolina.

**LEARN** Appliance service and repair. Motors, washers, refrigeration, cleaners, everything. Free booklet. Appliance, 11027 South Vermont, Los Angeles 44.

**DIESEL!** Learn to operate, maintain and overhaul all type engines—spare time. Write for Free Book. Utilities Diesel Training, Dept. DM-62, 2521 Sheffield, Chicago 14.

**BIG** Money—Operate own Fix-It Shop. Service household appliances, motors, mowers, saws, skates, etc. Free Book. Christy Trades School, A-301, 3214 Lawrence, Chicago 25.

**COMPLETE** Your High School at home in spare time with 62-year-old school. Texts furnished. No classes. Diploma. Information booklet free. American School, Dept. X246, Drexel at 58th, Chicago 37, Illinois.

**FREE** General Catalog—100 Pages Text vocational, educational, instructional subjects. Millions of volumes, new and used. Bargain prices. Books bought. Est. 1902. Long's College Book Co., Dept. PS, Columbus 1, Ohio.

**EARN** Diploma through Correspondence courses — Hypnology, Psychology. Join Hypnotists' Association. Representatives: Aured, Central Valley, New York.

**LEARN** Civil and criminal investigation at home. Earn steady, good pay. Institute Applied Science, 1920 Sunnyside, Dept. 332, Chicago 40, Illinois.

**STUDY** to be a doctor of psychology, metaphysics or divinity. Correspondence courses only. Neotarian Fellowship, Desk 7, Pickwick Bldg., Kansas City 6, Mo.

**HAVE** trouble memorizing mathematic formulas? This new plastic covered 3x5 card should solve your problems. Gives formulas from algebra, geometry, trigonometry, log tables, angle functions, etc. 50c ea., 3 cards \$1. Redi-Reference, 35 Corchaug, Port Washington, N. Y.

**TIMESTUDY.** Key to positive personal profit! Free information. Associated Techniques, Box 426, Cedar Rapids, Iowa.

**LEARN** Tile Setting at home. Free details. American Institute of Tile Setting, Box 217, Oakland 4, California.

**DYNAMIC** Singing, Speaking, Self-Training. Thrilling! Canfield Voco-Records, 2018-C Fifth Avenue South, Minneapolis 4, Minnesota.

**CIVIL** Service. Training for U.S. Tests. Get full information about this field; home study preparation for high rating. Free Booklet. Private organization. No obligation. Franklin Institute, Dept. V13, Rochester 4, N. Y.

**BARTENDING.** Professional Home Study Course. All Implements Furnished. Bartending, Box 783, Lansing, Michigan.

**VOICE!** Secrets! Fantastic! Unbelievable! Free! Cor Studio, Box 681, Hesperia, California.

**BE** a Professional Real Estate Broker, or Appraiser, or both. Short concise, easily learned correspondence courses. H. Ward Conde, 327 Ouachita Ave., Hot Springs, Ark.

**LEARN** Real Estate Business Fast. Unlimited opportunities. Economical home-study course. Particulars Free. Gordon-Howard Institute, 322 Glover Building, Kansas City 5, Missouri.

## 46 CONTESTS

**WIN** contest money. General Contest Bulletin gives hundreds of tips. Lists current contests, rules. Sample magazine 25c. General Contests, 1609-A East 5th, Duluth 12, Minnesota.

**CONTEST** Information—Winning Pointers—Send 35c. Guidebook, Box 246, Decorah, Iowa.

"WIN Prize Contests"—complete book 25c. Greenwood, Box 1116-A, New York City 8.

## 47 DETECTIVES

**DETECTIVES**—Work home—Travel. Experience unnecessary. Detective Particulars free. Write Wagoner, P-125 West 86th, New York 24.

**DETECTIVE** Profession. Home Study. Badge, Certificate, Future. Box 41197-G, Los Angeles 41, California.

**DETECTIVE** Training. Phillips Secret Service System, 1917-C North Kenneth, Chicago 39, Ill.

**DETECTIVE** course. Credentials, Diploma. Free information. Southwestern Institute Criminology, Box 2117-B, Lawton, Oklahoma.

## 48 LANGUAGE OUTFITS

**LEARN** world interlanguage endorsed by Unesco. Free lesson. Esperanto, Middleton, Wisconsin.

## 50 BUSINESS SERVICE INFORMATION, NAME LISTS

**LIVE** Names Available—Buyers, Prospects! (200,000 Mailorder Book; 15,000 Earthworm). D. Dickman Company, Willow Springs, Missouri.

## 52 AUTHORS SERVICE

**WANT** Your Book Published? Learn how we publish, advertise, promote, distribute. Many successes. Free booklet PS. Vantage, 120 West 31, New York.

## 53 ADVERTISING AGENCIES, ETC., FOR ADVERTISERS

**FREE** expert assistance for mailorder advertisers. Ratebook leading newspapers, magazines, 10c. Chicago Advertising Agency, Chicago 4.

**ADVERTISE:** 24 words, 100 Canadian Newspapers, \$5.50. Lists Free. Advertising Bureau, 10511-P Springfield, Chicago 43.

## 54 CARTOONING, SIGN PAINTING, CHALK TALKS

**CARTOON** Your way to success! Internationally known instructor, Raye Burns, will personally teach you to create original, salable cartoons at home. Cost of Course is very low. Write for free details. Raye Burns School, Box 3583-S, Cleveland 18, Ohio.

"HOW to Make Money With Simple Cartoons"—A book everyone who likes to draw should have. It is free; no obligation. Simply address: Cartoonists' Exchange, Dept. 192, Pleasant Hill, Ohio.

**PAINT** Signs! Use Patterns! Alphabet \$1.00. Harwell, PS-260, Byrdstown, Tenn.

**YOU** can Entertain with Chalk Talks. Catalog 10c. Cartoonist Balda, Oshkosh, Wisconsin.

## 55 TYPEWRITERS & OFFICE MACHINES

**IBM** Electric Typewriters \$49.95. Continental Distributing Company, Box 71, Temple City, California.

## 56 RUBBER STAMPS & OFFICE SUPPLIES

**FINEST** Commercial Quality Rubber Stamps, 3 Lines, \$1.00. Fast! Evero Stamps, Box 5377, Phoenix, Arizona.

**THREE** line, self-inking pocket rubber stamp; plastic case \$1, metal case \$1.80. L. Watson, P. O. Box 162, St. Charles, Illinois.

**INDEXED.** Cushioned, 3 lines \$1.00, 4 or 5 lines \$1.50. (Script, Print or Old English). Free Stock & Advertising Stamps Circulars, Type Chart, 1 Day Service. Youngers Stamp Shop, Princeton, Iowa.

**4-LINE** Pocket Stamp—name, address, phone \$1.00. Two (different) \$1.50. Retter, 447-PS, Troy, Ohio.

**FREE**—Rubber Stamp Catalog. Martins, 1425 Major Drive, Jefferson City, Missouri.

**THREE** lines, name and address, \$1.00. Two such stamps, each different, same order, \$1.75. L. E. Anderson, P. O. Box 2336, Portland 14, Oregon.

## 57 PRINTING, MULTIGRAPHING, ETC.

**FREE** Catalog. Postpaid printing, Rubber stamps. D M Press, Sebastopol, Calif.

**OFFSET** Printing—24 Hour Service—\$6.75—1000 8½x11, \$18.50—5000. National Letter, 300 West 43rd St., New York City 36.

**1,000** BUSINESS Cards, "Raised Letters" \$3.95. Samples. Pioneer, PS-2 Island Park, New York.

**FREE** Business Printing Catalog; Samples. Howprint, 723-W Eunice, Webster Groves 19, Missouri.

**100** 6¼ Envelopes, 100 5½x8½ Letterheads printed, \$2.35. M. Portney, R3, Dillsburg, Pa.

**EMBOSS** Business Cards \$3.49 1000. Diamant, 534 State, Hammond, Indiana.

**500** 6¼ ENVELOPES \$4.95 Postpaid. Noteheads same. Dornfeld, Iron Ridge, Wisconsin.

**SHARP!** Letterheads, envelopes—samples free! Ink-Daubers, 933 Longfellow, Jackson, Michigan.

**QUALITY** Business Printing. Free Samples. Rayborg, 810 West 18th, Erie, Penna.

**LETTERHEADS.** Circulars, etc. Price list. Valaitis, 1705 South 2nd, Phila. 10, Pa.

**MIMEOGRAPHING.** Offset. Complete Lettershop Services. Samples. Pennsway, Drawer 1470, Scranton, Penna.

**1,000** BUSINESS Cards, "Raised Letters." \$3.50 Postpaid. Samples. Ellis, 5909 Highlandview, Sylvania, Ohio.

**QUALITY** Printing, lowest prices. Stone Press, 203 West Allegheny, Philadelphia 33, Penna.

**500** ¾x2¼ Four Line Stickers \$1.00. Red Border \$1.50. Moritz, 312 Tuscola, Saginaw, Mich.

**NEED** Printing? Write For Samples. Prices. Mayfield, Box 8011-C, Chattanooga 11, Tenn.



# POPULAR SCIENCE OPPORTUNITIES

## 58 PRINTING OUTFITS, SUPPLIES

**PRINTING** Outfits, type, supplies. Send dime for illustrated supply book and samples. Kelsey, Inc., H-8, Meriden, Conn.

**SILK** Screen Stencils Low, low prices. Quick service. Shackelfords, 242 Third, Pittsburgh 22, Penna.

**MAKE** Your Own self-molding rubber stamps and printing cuts. Plexirubber, Argyle 2, Wisconsin.

**RUBBER** Stamp Makers Supplies. Kiewiet, 2025 Barney Road, Kalamazoo, Michigan.

**RUBBER** Stamp Presses, Hydraulic Operated. Electrically heated. Sizes 5"x8", 8"x12", 10"x15", starting outfits, supplies. Printing Presses, supplies. Custom Manufacturing, 507 N. Jefferson, Springfield 2, Missouri.

**TYPE** cases, cabinets. Manufacturer. Catalog. King McKay Company, 23179 Telegraph, Southfield, Michigan.

**PRINTING** Presses, Type, Supplies. Lists, 4c. Turnbaugh Service, Mechanicsburg, Pa.

## 60 FOR INVENTORS

**INVENTORS**, if you have an invention for sale, patented or unpatented, write Institute of American Inventors, Dept. 30A, 635-F St., N.W., Washington 4, D. C.

**WE** have the markets if you have the ideas. Harvey Engineering, Cambridge 1, Maryland.

**INVENTORS**—Get The Best Offer First! Patented or unpatented. Write Carl Sommer, Director, Industrial Invention Sales, 3136-B Sylvania Ave., Toledo 13, Ohio.

**INVENTORS** Don't sell your invention Patented or Unpatented until you receive our offer, write Cowgill, Box 298-C, Marion, Ohio.

**INVENTIONS** wanted immediately for promoting on cash or royalty. Patented, unpatented. Free booklet outlines royalty rates, requirements. Write Kessler Corporation, C-72-PI, Fremont, Ohio.

**YOU** can easily apply for patents. Save with complete professional kit. Free Registration Certificate. Patent Associates, Suite 1213, Commonwealth Bldg., Philadelphia 7, Pa.

**PROTECTION** without patents or copyrights. Tekservice, 282 Woodcliff Station, North Bergen, N. J.

**INVENTORS'** Complete Service. Cash-Royalties Sales. Inventions Researched. Patent Development Engineering. Free Invention Certificate. George Spector, Licensed Invention Engineer, 3615 Woolworth Building, New York.

**INVENTORS!** Consider our offer first before selling or licensing your invention on a cash or royalty basis. Patented. Unpatented. Inventions on Demand, 79 Wall Street, New York 5, N. Y.

**INVENTORS!** Determine patentability of your invention. Searches of the Patent Office Records administered professionally—\$6.00. For free invention protection forms, dependable service write Washington Patent Office Search Bureau, 1426 G Street, N.W., Washington 5, D. C.

**INVENTIONS** wanted now by my Manufacturer Clients. Patented. Unpatented. Write Gilbert Adams, Patent Broker, 80 Wall Street, Financial District, New York City.

**SEARCHES** \$6.00, including copies of related patents. Original "World-Wide" service to Inventors, Patent Attorneys, Manufacturers. Free "Record Form." Write Miss Jane Hayward, 310 Realty Building, Washington 5, D. C.

**INVENTORS**—New low cost easy-to-apply-for Patent Kit. Free "Protection and Registration Form". Patent Research, 2105 Hamilton, Pultneyville, New York.

**PATENT** Searches \$6.00. 48-hour airmail service. Invention Protection forms free. Write Patent Engineering Service, 711 14th Street N.W., Washington 5, D. C.

**PATENT** Searches including copies of nearest patents. \$6.00. Reports airmailed within 48 hours. More than 200 registered patent attorneys have used my service. For Free Invention Protection forms. Write Miss Ann Hastings, P. O. Box 176, Washington 4, D. C.

**PATENT** Searches \$6.00. 48-hour service. Free Invention Protection forms. Write Raymond L. Smith, Patent Searcher, 620 Sheraton Building, Washington 5, D. C.

**PATENT** application on simple invention filed for United States and Canada, with design development and market service for \$200.00 service charge. Thirty years exclusive patent practice. Joseph O'Brien, Patent & Development Engineer, 132 Nassau Street, New York 38, N. Y.

**INVENTORS**—Save High Fees! Apply for your Patent yourself. New "Do-It-Yourself" Patent Kit now makes it easy. Free "Registration Form." Miss Clare Arden, 806 Wm. Penn Annex, Philadelphia 5, Penna.

## 60A ENGINEERING SERVICES

**ENGINEERING**. Development. Drawings. Todd, Consulting Engineer, 424 West 119th, New York 27.

**PROFESSIONAL** Engineer offers services at reasonable rates; designing, developing; drawings, blueprints prepared. F. B. Ledermann, P. E., 154 Nassau Street, New York 38.

## 61 INVENTIONS WANTED

**INVENTORS:** Hundreds of manufacturers have requested our assistance in locating marketable new products. Complete information free. Institute of American Inventors, Dept. 30C, 635-F Street, N. W., Washington 4, D. C.

**INVENTIONS** wanted. Patented; unpatented. Tremendous Manufacturers lists. Global Marketing Service, 2420 77th, Oakland 5, Calif.

**ARE** you interested in offers from reliable manufacturers for your invention? Patented, unpatented. Harvey Engineering, Cambridge, Maryland.

**INVENTORS**—Get The Best Offer First! Patented or unpatented. Write Carl Sommer, Director, Industrial Invention Sales, 3136-B Sylvania Ave., Toledo 13, Ohio.

**INVENTORS** Don't sell your invention Patented or Unpatented until you receive our offer, write Cowgill, Box 298-D, Marion, Ohio.

**INVENTIONS** Wanted: "Patented"—"Patent Pending." 29 Years experience Promoting Inventions. National Service Bureau, 3122 Meramec, St. Louis 18, Missouri.

**INVENTORS**—Do you want to sell or license your invention on cash or royalty basis? Write Kessler Corporation, C-72, Fremont, Ohio.

**FREE** List Needed Inventions. Protection Form. Inventors Sales & Engineering Bureau, Dept. 162-E, Box 4973, Washington 8, D. C.

**INVENTORS!** Outright cash sale or royalties for your inventions. Patented. Unpatented. Constant demand from our client manufacturers. Write United States Invention Brokerage, 15 Park Row, New York 38, N. Y.

**INVENTORS'** Complete Service. Cash-Royalties Sales. Inventions Researched. Patent Development Engineering. Free Invention Certificate. George Spector, Licensed Invention Engineer, 3615 Woolworth Building, New York.

**INVENTORS!** Consider our offer first before selling or licensing your invention on a cash or royalty basis. Patented. Unpatented. Inventions on Demand, 79 Wall Street, New York 5, N. Y.

**INVENTIONS** wanted now by my Manufacturer Clients. Patented. Unpatented. Write Gilbert Adams, Patent Broker, 80 Wall Street, Financial District, New York City.

**FREE**—"Vital Information Every Inventor Needs Before Selling Invention." Adams, 15 Park Row, N.Y.C.

**SAVE** high fees for selling your invention. Ketchums' Advertising, 1058-C, Springfield, Illinois.

**SUPERIOR** promotions. Patented, unpatented inventions. Information booklet, free. Superior, 338-342 North Rodeo, Beverly Hills, California.

## 64 MODELS, MODEL SUPPLIES

**SHIP** Models. Most complete line in New England. Kits, fittings, plans, books, tools, engines, motors. Illustrated catalog 35c. James Bliss and Co., Inc., Dept. PS, 342 Atlantic Avenue, Boston 10, Massachusetts.

**SHIP** and yacht model fittings; blueprints. Send 40c for illustrated catalog #29 listing hundreds of items. A. J. Fisher, Inc., 1002-2 Etowah Ave., Royal Oak, Michigan.

**"POWER** Drives Handbook"—36 pages illustrating many types motor drives for model autos, boats, displays, turntables, etc. Mail 25 cents cash, returnable first order \$3.00 or more. Wilson's of Cleveland, Dept. PS, P. O. Box 8995, Ft. Lauderdale, Fla.

**SHIP** Model Kits And Fittings: Clippers, Schooners, Frigates, Briggs, Plaque Models. Plans. Catalog And Book List 25c. Model Shipways, Box 85, Bogota, New Jersey.

**LIONEL** Trains Big Discounts Catalog 25c. Mack Bros., 2041 Chicago Ave., Chicago 22.

**MODEL** Cars, electrified roadways. Electromat Company, Box 13742, Dallas 16, Texas.

**ROCKET** Supplies, Nozzles, Cones, Tubes, Specials Also Made, Catalog 10c. Sky Mfg. Co., Mineral Point, Pa.

**POWER** Models. Unusual steam, gasoline and traction engines, fittings, metals. "O" Rings, Teflon, Molykote. Comprehensive 92-page catalog, \$1.00. Charles Cole, Ventura, Calif.

**"ST"** Steam Engine Castings, Fittings Catalog 15c. Ship Models Ltd., 186 Summer, Andover, Mass.

**ROCKETEERS:** Supplies, Chemicals. Catalog, Plans 25c. Central Rocket Company, Waupaca, Wisc.

## 65 HOME CRAFTSMAN

**LEARN** Art Metalcraft and jewelry making. Complete, inexpensive, home training course now available. Special tools and materials furnished. Write for free booklet. Interstate Training Service, Dept. L-2, Portland 12, Oregon.

**NEW** big illustrated catalog. Supplies for Leathercraft, Metalcraft and numerous small inexpensive crafts. Prompt shipments. Top values. Latest ideas. Send 10c today to J. C. Larson Co., Dept. 9526, 820 S. Tripp, Chicago 24.

**101 PATTERNS** of smart Gifts, Novelties, Shelves, Action windmills plus "Make Money Jig Sawing." (\$1.00) Mastercraft, 25S, 7041 Olcott, Chicago 31.

**136-PAGE** Catalogue: enameling, mosaics, jewelry, ceramics. 50c (refundable) Bergen, 300A S.W. 17th Avenue, Miami, Fla.

**FREE.** New plans catalog. Make 2400 things. Fun. Profit. Craftplans, 1322-B Wabash, Chicago 5.

**FREE** "Do-It-Yourself" Leathercraft Catalog. Tandy Leather Company, Box 791, L34, Fort Worth, Texas.

**LEATHERCRAFT** Superior leather, tools, kits, Catalog 30c. Midas, Box 1255, Huntington Park, California.

**GRANDFATHER** clock movements, case plans, kits. Wholesale catalog 25c. Mason-Sullivan, Noroton 2, Conn.

**WOODWORKING** and Cabinetmaking course for beginning and advanced home craftsmen. Only complete low-cost home training program available. Write for free booklet. Interstate Training Service, Dept. G-2, Portland 12, Oregon.

**KNOCKDOWN** cedar chest over 50 kits. Catalog 25c. Gilco, Brownsboro, Alabama.

**BELT** Sander—easily made from plans. Also, low cost kits. Free literature. Gipple, 121-B School, Buffalo 13, N. Y.

**PICTORIAL** Illustrations, How to Remove Old Finish. Also 24 Page Catalog Finishing Materials, Kits, Instructions, Color Panels. Send 20c Coin Or Stamps. Gaston Finishes, Box 1246, Bloomington, Indiana.

**COOL!** Attractive! Install your window air conditioner underneath house without expensive duct work. Outlets in several rooms. Complete plans \$1.25. Box 184, Smyrna, Ga.

**KILN** Dried Walnut, Cherry, Etc. Hardwoods, Blocks Boards And Squares. Midland Lumber Company, P.O. Box 262, Savannah, Mo.

**WRITE** for free catalogue of craft supplies. New lower than discount prices. Apache Leather Co., 2804 East Washington St., Phoenix, Arizona.



8 100 10 1000 10 1000000

**This One**



**9AWR-5CZ-Z76A**



**FREE!!** Leathercraft catalog. Hundreds of new items. Write MacPherson Bros. Leather Company, Dept. A, 730 Mission St., San Francisco 3, Calif.

**MIRACLE** weld by manufacturing chemists over thirty years. Amazing plastic iron will weld any material. repair machine tools and household items. Order today \$2.00 postpaid. Wherry Engineering Co., 3617 Washington, Houston 7, Texas.

## 66 DO IT YOURSELF

**FALLOUT** Shelter you can build. Plans \$1.00. Wiman, Box 1005B, Douglas, Alaska.

**FREE** "Do-It-Yourself" Leathercraft Catalog. Tandy Leather Company, Box 791-Z-34, Fort Worth, Texas.

**REWARD** yourself! How-to-Fix-It book. 600 pages; home repairs. \$2.95, guaranteed. North Star Products, Box 112-FS, Cedar Grove, New Jersey.

**MAKE** Beer 4c per quart. Instructions \$1.00. Johnson, P.O. Box 473, Oak Ridge, Tennessee.

**WATCH** Repairing; Information Free. Max Presant, 21 East VanBuren, Chicago 5.

**BUILD** own Ant farm complete. Instructions \$1.00. Merlin Rodman, Box 54, Culver, Oregon.

**BUILD** vibrating health massage table mostly from scrap materials for less than \$10.00. Save up to \$150.00. Take professional type reducing, relaxing, massage treatments at home free. Send \$2.00 for complete plans and instructions. Specialty Designs Co., Box 4123 N.E. Station, Dearborn, Michigan.

**ALASKAN** King Crab T.V. Lampshade. Genuine shell. Unusual conversation piece. \$3.00 postpaid in U.S. Far North Novelties, Box 455, Homer, Alaska.

**HOW-To-Do-It** Books. 90 titles. Postal brings details. Direct Mail Sales, Box 552, Wichita 1, Kansas.

**MOSAIC** Tile, Leatherette Upholstery Supplies. Samples. Makransky, 1567 Townsend Ave., New York 52.

## 67 OLD GOLD, JEWELRY, WATCHES, ETC.

**USED** and new watches \$2 up. Free List. Southern Watches, 5-PS So. Wabash, Chicago 3.

**FREE** catalog. Costume jewelry parts. Supplies. Reasonable prices. Fast service. Guaranteed quality. Unique merchandise. Folsom's, Box 52, Medford 55, Massachusetts.

**COSTUME** Jewelry Supplies. Settings, Rhinestone, etc. 88 page illustrated catalog. 30c. Milady, Box 1328 G.P.O., New York City (1).

**HIGHEST** Cash For Old Gold, Jewelry, Gold Teeth, Watches, Diamonds, Silverware, Spectacles, Platinum, Mercury. Free information. Rose Refiners, Heyworth Bldg., Chicago 2.

**HIGHEST** Cash Paid for Old Gold, Jewelry, Gold Teeth, Diamonds, Watches, Silver, Mail Articles Today. Information Free. Chicago Gold Refining Co., 6 E. Monroe, Dept. 1857, Chicago 3.

**WANTED**—Old Gold jewelry, spectacles, teeth, watches, silverware, Platinum for Cash. Electro Company, 1042 Highland Ave., Buffalo 23, New York.

**GOLD**, silver, platinum, bought. Any condition. Highest prices. Noble Metals Co., Box 1113, Santa Monica, Calif.

**WATCHES**. Stylish. Imported. Guaranteed. Terms. N.M. Co., Box 1113, Santa Monica, California.

**WHOLESALE** Quality Jewelry Findings: Chains: Charms: Fraternal, Religious Emblems. 100% satisfaction guaranteed! Catalog 10c, refundable. PS-2-60, Caraday, Box 22, West Hempstead, New York.

**10** SWISS Watches \$18.00. Catalog 25c. Berkowitz, 1150 Castlehill, New York City 62.

**14K** R.G.P. Wire Name Pins, Name Tie Clasps \$2.00 Tax Inc. Burkes Jewelry, 837 Bridge St., Schenectady, New York.

## 68 TOBACCO & PIPES

**CIGARS**—From Growers' finest tobacco. Write for free sample. Satisfaction guaranteed. Hudson, Westfield, Mass.

## 69 FOR THE HOME

**CREAMY** milk 7-14c quart anywhere! How information 35c. Dariplan, B-448, Campbell, California.

## 70 OF INTEREST TO WOMEN

**MAKE** \$25 to \$35 weekly addressing envelopes. Our instructions reveal how. Glenway, Box 6568, Cleveland 1, Ohio.

**DRESSES** 24c; Shoes 39c; Men's suits \$4.95, trousers \$1.20. Better used clothing. Free Catalog. Transworld, 164-H Christopher, Brooklyn 12, N. Y.

**STAMPED** Linens For Embroidery Or Painting. Buy direct from manufacturer and save. Send for Free catalog. Merribee, 16 West 19th St., Dept. 707, New York 11, N. Y.

**MAKE** Easy Money Addressing-Mailing! Pleasant Work, Write—Merrill Hestand, Box 182E, Hatfield, Penna.

**\$200**, MONTHLY Possible. Sewing Baby-wear! No house selling. Free Information. Send name to Cuties, Warsaw 14, Indiana.

## 71 FOR SALE MISCELLANEOUS

**BALL** Pens \$22.00 per thousand. Assemble yourself. Large users only. Perma-rite, 712 Broadway, New York 3, N. Y.

**MILLIONS** of items—Surplus merchandise—2c on dollar. Details free. E. Benfield, 2401 Randolph, Alexandria, Va.

## 72 WANTED TO BUY

**QUICKSILVER**, platinum, silver, gold. Ores analyzed. Mercury Terminal, Norwood, Massachusetts.

## 73 WEARING APPAREL

**PERSONALIZED** Sweat shirts—Any first name hand-screened in red on a white byron collar, half zipper sweat shirt. Children's sizes S-M-L. Adult sizes S-M-L. \$3.00 postpaid. Screen Print Specialties, Wabeno, Wisconsin.

## 74 RAZOR BLADES, SHAVERS

**NEW** Samples—Something Different And Amazing Booklet—30c. Persila, 436 N. Y. Ave., Brooklyn 25, N. Y.

## 75 TATTOOING SUPPLIES

**LEARN** profitable, fascinating Tattooing. Illustrated Information \$1.00. Zeis, 728-B Leslie, Rockford, Illinois.

## 77 GEIGER COUNTERS & TREASURE FINDERS

**TRANSISTOR** Treasure Detectors, underwater detectors. Many models. Free catalog. Gardiner Electronics Co., Dept. 1, 2545 East Indian School, Phoenix, Arizona.

**GOLD-Silver** Detectors, Geiger Counters, Violites for tungsten, etc. Best available. Guaranteed. Information Free. Detectron, Dept. 27, Sylmar, Calif.

**UNDISCOVERED** Wealth! Transistorized M-Scope detects gold, silver, jewelry, etc. Lightweight, guaranteed. From \$59.50. Easy Terms. Free Catalog. Fisher Research, Dept. C-2, Palo Alto, Calif.

**"ORGANIZED** to help you." Send 25c. Treasure Hunter's Club, P.O. Box 52-193, Miami 52, Fla.

**TREASURE!** Map, Handbook 25c. Locators. Howe, 811 Kansas, Atchison, Kansas.

## 78 WATCH REPAIRING

**WATCH** and clock repairing books. Free catalog. North American, 2320-BP Milwaukee, Chicago 47, Illinois.

**WATCHMAKERS'**, Jewelers', Lapidaries' Catalog 25c. Bengal, 8912 Venice, Culver City, California.

**WATCHES** repaired, cleaned, \$3.95 guaranteed. Lan's, 17 South Center, American Fork, Utah.

**WATCHMAKERS'** Tools, Materials, Supplies. Watches. Catalog. Gales, Box 1000, Chicago 90, Illinois.

## 79 MISCELLANEOUS

**ORNAMENTAL** Iron designs. Book of 1700 beautiful, practical designs for railings, columns, etc. Free literature. Cunningham, 3881 South 3200 West PS-31, Salt Lake City 4, Utah.

**COLORADE** Water Fountains, Automatic Stroboscopic Color Effects. 809 Delaware, Berkeley, California.

**PLANS**. 48" sheet metal Brake 35c. Carosello, Box 31, Baden Station, St. Louis 15, Mo.

**"HOMEBREWED** wines, beers" Complete instruction manual—\$1.00. Dean Products, Box 40-PS, Elberton, Georgia.

**GET** Samples, Opportunities, Magazines, Catalogs, Offers Galore! Your Name in 5000 Big Mail Directories—25c. Results Guaranteed. King's, Morretown, Ontario, Canada.

**CESSPOOLS**, septic tanks, all clogged drains cleaned, deodorized by new enzyme product. Saves annual pumping, digging, etc. Harmless to plumbing, pets or people. Simply flush through toilet. Six months' supply only \$2.95. Mailed anywhere in U.S.A. Electric Sewer Cleaning Co., Allston 34, Mass.

**IMPROVED** Mimeographs thirty times better. Write: Ziemba, 6123 Orchard, Dearborn, Michigan.

**RECEIVE** mails, magazines, samples. Your name in numerous mailing lists 25c. Greenwood, Box 1116-BT, New York City 8.

**RECEIVE**—Magazine Samples. Mails, Catalogues, Bargains From Everywhere. Get Listed 25c. Rorick's, Cincinnati 26, Ohio.

**RECEIVE** Mails, Catalogs, Magazines. Year 25c. Ferland, Box 953-K, Bristol, Conn.

**MIRROR**—Transparent back. Watch, photograph people—secretly! 8"x10", \$2.00; 16"x20", \$5.00. One-Way Mirror, PS-260, Box 625, Mt. Vernon, N. Y.

## 79B SWAP

**READ** "Trading Post Magazine", 10c. Thorne's, 525 Dewey, Jackson 35, Michigan.

## 80 PERSONAL

**MEXICAN** Legal Matters. A Espejo, Box 217, Tijuana, Mexico.

**PSORIASIS** Sufferers: Discouraged? Here's help! You pay nothing unless satisfied. Free details. Pixacol, Box 3583-SP, Cleveland 18, Ohio.

**BORROW** By Mail. \$100-\$600. Anywhere. Air Mail Service. Postal Finance, Dept. 16-B, 200 Keeline Building, Omaha 2, Nebraska.

**BORROW** \$50 to \$600 By Mail. Quick. Easy. Private. No Co-Signers. Repay in 24 small monthly payments. For the amount you want write today to Dial Finance Co., 410 Kilpatrick Bldg., Dept. B-1, Omaha 2, Nebraska.

**WIN** Success. Easy System. Details Free. Callender, Box 91, New York 30.

**"RULE** Others with your Thoughts." Telepathy. Write: Clarion, Box 9309-S6, Chicago 90.

**LOANS** By Mail. \$50 To \$600 For any purpose. Employed men and women eligible. Confidential. 2 years to repay. Write for free loan application. American Loan Plan, City National Bldg., Dept. PS-12289, Omaha 2, Nebraska.

**INVESTIGATE** Healing Power. Send 25c for evidence. Hinkles, Dayton, Va.

**POISON** Ivy Victims: For relief send \$1.00 to Reid, Box 33, Montville, Ohio.

**SUPER** memory overnight! Success guaranteed! Bijou, Box 1727-V, Hollywood 28, Calif.

**MEXICAN** Law. Attorney Cenicerros, Apto. 79-Cd. Juárez, Chih., Mexico.

**"X-RAY** Eyes." Staggering power. Adults. Write Clarion, Box 9309-X6, Chicago 90.

## 80A REMAILING SERVICE

**BENSONS**, 152 West 42, New York 36. \$3.00 month no remailing charge.

**SECRET** or non-secret receiving, forwarding letters, packages. Texas or Indiana address \$5.00 per month. Box 347, New Castle, Indiana.

**CALIFORNIA** remailing, 25c each letter. 4822 Iroquois Ave., San Diego 17, Calif.

**SECRET** Mail Receiving-Forwarding System. Hedgpeth, Box 830, Alhambra 24, California.

**REMAILS**, Replies forwarded — 25c; monthly—\$3.00; Sunday classifieds \$1.00; Souvenirs, etc. Strictly confidential. Box 694, Saint Louis 88, Missouri.

**REMAILS** 25c Monthly \$3.00 Prompt receiving-forwarding. Lillian's, Box VC3011B, No. Hollywood, Calif.

**MAIL** received, forwarded, 25c letter. \$3.00 Month. Lloyd Moffit, 2911 N. Flagler, West Palm Beach, Florida.



# "HOW A 'CRAZY RUMOR' GOT ME PROMOTED!"



**What I overheard one morning shook me right out of a rut!**

"Company's getting ready to cut back . . . bound to be layoffs," I heard them say. "Just another crazy rumor," I told myself.

Just the same, I took quick stock of myself that night. Came up with four good reasons why the company would keep me on:

*Three years' experience  
Getting along with foreman  
Turning out acceptable work  
Prompt and dependable*

And four just-as-good reasons why they might let me go:

*Making no real headway  
Others better qualified  
Still rated "semi-skilled"  
Needs special training*

I wasn't in trouble. But I sure wasn't "in solid" like I should be. That's when I made up my mind to enroll for training with I.C.S.

I picked I.C.S. because it's the oldest and largest with 257 courses. The training is quick and thorough. It's recognized by my company and accredited by the National Home Study Council. You study in your spare time and get personalized, practical instruction—know-how you can apply next day on the job.

That was a year ago. There have been two layoffs since then. While some of the others were just hanging on or being released, I was moving up. My I.C.S. training started something. Not only did it get me promoted (with a fat pay hike), but it put me in line for real advancement.

Don't wait for a "crazy rumor" to set you straight. Take out your "job insurance" right now. Mail the coupon and get full, free details on how I.C.S. has helped thousands, how it can help you. No obligation—and you get three valuable books *free!* (1) How to Succeed; (2) Catalog of opportunities in the field of your choice; (3) Sample lesson (math).

**For Real Job Security—Get an I. C. S. Diploma!**

**I. C. S., Scranton 15, Penna.**

Accredited Member,  
National Home Study Council

## INTERNATIONAL CORRESPONDENCE SCHOOLS



**BOX 73659B, SCRANTON 15, PENNA.**

(Partial list of 258 courses)

Without cost or obligation, send me "HOW to SUCCEED" and the opportunity booklet about the field BEFORE which I have marked X (plus sample lesson):

- |  |   |   |   |  |
|--|---|---|---|--|
| <b>ARCHITECTURE and BUILDING CONSTRUCTION</b><br><input type="checkbox"/> Air Conditioning<br><input type="checkbox"/> Architecture<br><input type="checkbox"/> Arch. Drawing and Designing<br><input type="checkbox"/> Building Contractor<br><input type="checkbox"/> Building Estimator<br><input type="checkbox"/> Carpenter Builder<br><input type="checkbox"/> Carpentry and Millwork<br><input type="checkbox"/> Carpenter Foreman<br><input type="checkbox"/> Heating<br><input type="checkbox"/> Painting Contractor<br><input type="checkbox"/> Plumbing<br><input type="checkbox"/> Reading Arch. Blueprints<br><b>ART</b><br><input type="checkbox"/> Commercial Art<br><input type="checkbox"/> Magazine Illus.<br><input type="checkbox"/> Show Card and Sign Lettering<br><input type="checkbox"/> Sketching and Painting<br><b>AUTOMOTIVE</b><br><input type="checkbox"/> Automobile<br><input type="checkbox"/> Auto Body Rebuilding and Refinishing<br><input type="checkbox"/> Auto Engine Tuneup<br><input type="checkbox"/> Auto Technician | <b>AVIATION</b><br><input type="checkbox"/> Aero-Engineering Technology<br><input type="checkbox"/> Aircraft & Engine Mechanic<br><b>BUSINESS</b><br><input type="checkbox"/> Accounting<br><input type="checkbox"/> Advertising<br><input type="checkbox"/> Business Administration<br><input type="checkbox"/> Business Management<br><input type="checkbox"/> Cost Accounting<br><input type="checkbox"/> Creative Salesmanship<br><input type="checkbox"/> Managing a Small Business<br><input type="checkbox"/> Professional Secretary<br><input type="checkbox"/> Public Accounting<br><input type="checkbox"/> Purchasing Agent<br><input type="checkbox"/> Salesmanship and Management<br><input type="checkbox"/> Traffic Management<br><b>CHEMICAL</b><br><input type="checkbox"/> Analytical Chemistry<br><input type="checkbox"/> Chemical Engineering<br><input type="checkbox"/> Chem. Lab. Technician<br><input type="checkbox"/> Elements of Nuclear Energy<br><input type="checkbox"/> General Chemistry<br><input type="checkbox"/> Natural Gas Prod. and Trans.<br><input type="checkbox"/> Petroleum Prod. and Engr.<br><input type="checkbox"/> Professional Engineer (Chem)<br><input type="checkbox"/> Pulp and Paper Making | <b>CIVIL ENGINEERING</b><br><input type="checkbox"/> Civil Engineering<br><input type="checkbox"/> Construction Engineering<br><input type="checkbox"/> Highway Engineering<br><input type="checkbox"/> Professional Engineer (Civil)<br><input type="checkbox"/> Reading Struc. Blueprints<br><input type="checkbox"/> Sanitary Engineer<br><input type="checkbox"/> Structural Engineering<br><input type="checkbox"/> Surveying and Mapping<br><b>DRAFTING</b><br><input type="checkbox"/> Aircraft Drafting<br><input type="checkbox"/> Architectural Drafting<br><input type="checkbox"/> Drafting & Machine Design<br><input type="checkbox"/> Electrical Drafting<br><input type="checkbox"/> Mechanical Drafting<br><input type="checkbox"/> Sheet Metal Drafting<br><input type="checkbox"/> Structural Drafting<br><b>ELECTRICAL</b><br><input type="checkbox"/> Electrical Engineering<br><input type="checkbox"/> Elec. Engr. Technician<br><input type="checkbox"/> Elec. Light and Power<br><input type="checkbox"/> Practical Electrician<br><input type="checkbox"/> Practical Lineman<br><input type="checkbox"/> Professional Engineer (Elec)<br><b>HIGH SCHOOL</b><br><input type="checkbox"/> High School Diploma | <input type="checkbox"/> Good English<br><input type="checkbox"/> High School Mathematics<br><input type="checkbox"/> High School Science<br><input type="checkbox"/> Short Story Writing<br><b>LEADERSHIP</b><br><input type="checkbox"/> Industrial Foremanship<br><input type="checkbox"/> Industrial Supervision<br><input type="checkbox"/> Personnel-Labor Relations<br><input type="checkbox"/> Supervision<br><b>MECHANICAL and SHOP</b><br><input type="checkbox"/> Diesel Engines<br><input type="checkbox"/> Gas-Elec. Welding<br><input type="checkbox"/> Industrial Engineering<br><input type="checkbox"/> Industrial Instrumentation<br><input type="checkbox"/> Industrial Metallurgy<br><input type="checkbox"/> Industrial Safety<br><input type="checkbox"/> Machine Shop Practice<br><input type="checkbox"/> Mechanical Engineering<br><input type="checkbox"/> Professional Engineer (Mech)<br><input type="checkbox"/> Quality Control<br><input type="checkbox"/> Reading Shop Blueprints<br><input type="checkbox"/> Refrigeration and Air Conditioning<br><input type="checkbox"/> Tool Design <input type="checkbox"/> Tool Making<br><b>RADIO, TELEVISION</b><br><input type="checkbox"/> General Electronics Tech. | <input type="checkbox"/> Industrial Electronics<br><input type="checkbox"/> Practical Radio-TV Eng'g<br><input type="checkbox"/> Practical Telephony<br><input type="checkbox"/> Radio-TV Servicing<br><b>RAILROAD</b><br><input type="checkbox"/> Car Inspector and Air Brake<br><input type="checkbox"/> Diesel Electrician<br><input type="checkbox"/> Diesel Engr. and Fireman<br><input type="checkbox"/> Diesel Locomotive<br><b>STEAM and DIESEL POWER</b><br><input type="checkbox"/> Combustion Engineering<br><input type="checkbox"/> Power Plant Engineer<br><input type="checkbox"/> Stationary Diesel Engr.<br><input type="checkbox"/> Stationary Fireman<br><b>TEXTILE</b><br><input type="checkbox"/> Carding and Spinning<br><input type="checkbox"/> Cotton Manufacture<br><input type="checkbox"/> Cotton Warping and Weaving<br><input type="checkbox"/> Loom Fixing Technician<br><input type="checkbox"/> Textile Designing<br><input type="checkbox"/> Textile Finishing & Dyeing<br><input type="checkbox"/> Throwing<br><input type="checkbox"/> Warping and Weaving<br><input type="checkbox"/> Worsted Manufacturing |
|--|---|---|---|--|

Name \_\_\_\_\_ Age \_\_\_\_\_ Home Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_ Working Hours \_\_\_\_\_ A.M. to P.M. \_\_\_\_\_

Occupation \_\_\_\_\_ Canadian residents send coupon to International Correspondence Schools, Canadian, Ltd., Montreal, Canada. . . . Special low monthly tuition rates to members of the U. S. Armed Forces.



# Special Offer! TO Popular Science

Take

4

12" Long Play



High Fidelity

## ALBUMS

RETAIL VALUE UP TO \$19.92 — PAY ONLY



**JACKIE GLEASON**  
147. Mood magic —with strings and Bobby Hackett's trumpet. \$4.98



**FERDE GROFÉ**  
122. Slatkin conducting The Grand Canyon and Mississippi Suites. \$4.98



**LEOPOLD STOKOWSKI**  
2. Landmarks of his career. Works by Bach, Debussy, Strauss, etc. \$4.98



**RODGERS and HAMMERSTEIN**  
102. Movie sound track with Gordon MacRae and Shirley Jones. \$4.98



**GEORGE GERSHWIN**  
1. His famous compositions — American in Paris, Rhapsody in Blue. \$4.98



**HARRY JAMES**  
117. A new collection of ballads and songs to listen and dance to. \$3.98



**Stan Kenton**  
6. Lover, Painted Rhythm, Southern Scandal, Peanut Vendor, etc. \$4.98



**PAUL WESTON**  
142. A brand new album of "Music for Dreaming". 12 songs. \$3.98



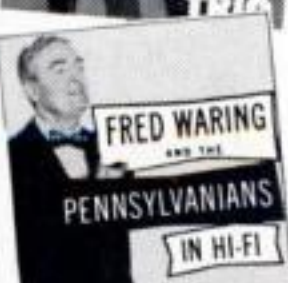
**Bobby Hackett**  
**Jack Teagarden**  
121. Baby Won't You Please Come Home, 'S Wonderful, 8 more. \$3.98



**HOLLYWOOD BOWL SYMPHONY**  
118. Chopin's greatest music in superb orchestral performance. \$4.98



**KINGSTON TRIO**  
98. Tom Dooley, Three Jolly Coachmen and many others. \$3.98



**FRED WARING**  
99. Fred directs the Pennsylvanians in 17 of your all-time favorites. \$4.98



**GEORGE SHEARING**  
101. What Is There to Say, Black Satin, Starlight Souvenirs, others. \$3.98



**Gaite Parisienne**  
110. Offenbach's exuberant ballet music. Conductor: Felix Slatkin. \$4.98



**Glen Gray**  
115. He recreates the sounds of Krupa, Dorsey, Miller, others. \$4.98



**Guy LOMBARDO**  
100. Say It Isn't So, Be Careful, It's My Heart, 38 more Berlin hits. \$3.98



**Keely Smith**  
116. 12 tender tunes. S'posin', All the Way, Sweet and Lovely, etc. \$3.98



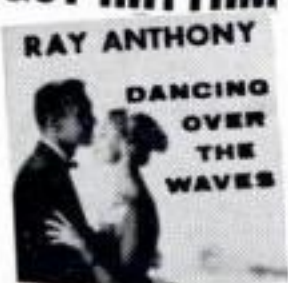
**CARMEN DRAGON**  
112. Great Music of France: Faust Waltz, La Marseillaise, etc. \$4.98



**NAT KING COLE**  
104. Who's Sorry Now, Just One of Those Things, 10 more. \$4.98



**JUNE CHRISTY**  
107. June sings When Lights Are Low, Easy Living, 9 others. \$3.98



**Ray Anthony**  
139. Ray and the orchestra at their light, danceable best. \$3.98



**FELIX SLATKIN**  
119. Stars and Stripes Forever, Anchors Aweigh, 11 others. \$4.98



**DEAN MARTIN**  
SLEEP WALKER



**DYNAMIC!**  
JUMPIN' WITH JONAH

### HOW TO SAVE MONEY on the Albums you want from the greatest of classics, to the biggest of

**YOU GET FOUR ALBUMS—WORTH UP TO \$19.92** (retail value) as a member of the Capitol Record Club and pay only \$4.98. As a member you agree to buy six additional records of the next 12 months from over 200 to be offered! Then you may resign, or retain membership by buying only three additional records annually with full bonus credit. For the records you buy pay only the usual retail price plus a small charge for packing and mailing.

**MORE FREE ALBUMS!** Each time you buy two more records your agreed upon six future selections, you may choose long-play BONUS ALBUM worth \$3.98 or \$4.98, from a list of current Capitol best sellers... FREE!

**UNLIMITED CHOICE!** Each month you receive the Record Review, describing the month's selections. If you want a selection in the division you joined (Classical... Best-Hits and Show Music... or Hi-Fi Jazz), do nothing; it will come automatically. If you wish any of the other selections or no record that month—simply notify the Club on the card always provided.

**BUT HURRY** to get your FOUR ALBUMS—and pay only \$4.98. The first three are Bonus Albums which will be earned as you buy your second, fourth and sixth additional album (the rate of at least one every other month), but which are yours now in advance.

**SEND NO MONEY—RISK NOTHING!** If not delighted, return your four albums within 7 days and your membership at no charge will be cancelled without further obligation. Send coupon to: Capitol Record Club, Dept. 5066, Scranton, Pennsylvania.





## how to be a hero... on a budget!

Think what a hit you'll make with a fishing rig like this! Fishermen who love their families pick Evinrude's 40 hp Big Twin as the smart *big power economy buy of the year*. Power enough to take the family along for fishing, picnicking, camping... and plenty of power to ski your own kids and your neighbor's, too. Nothing can match it near its price!

Frankly, Big Twin is as fine a performer in every respect as Evinrude's luxury Lark II, except for electric starting and

automatic choke. And Big Twin starts easier by hand than other motors of lesser hp. It has the same magnificent Lark II engine under the hood... with advanced thermostatic temperature control. It's the most efficient, smoothest-running, longest-lasting engine money can buy. It'll give you the same silk-smooth trolling, crisp response, and commanding power as the Lark II.

Feature for feature... dollar for dollar... nothing can match Big Twin's genuine value! Be a hero to your family... see how little it costs to own, at your Evinrude dealer today!



A Div. of Outboard Marine Corp.  
In Canada: Peterborough, Ont.

# EVINRUDE

FIRST  
IN  
OUTBOARDS

### CATALOG FREE!

EVINRUDE MOTORS  
4197 N. 27th St., Milwaukee 16, Wis.

Send me catalog of 1960 Evinrude

Motors with details of today's most advanced features.

Name.....

Address.....

City.....Zone.....State.....



**40hp  
BIG TWIN**

Big power  
economy buy  
of the year!